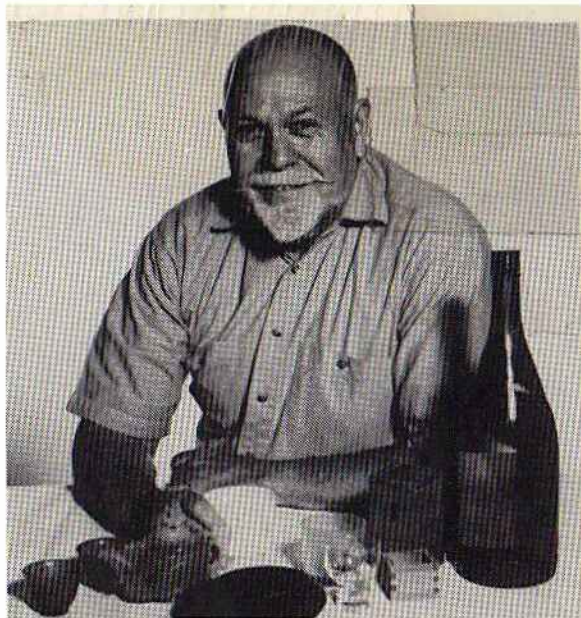




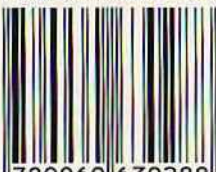
**SAKE
(U.S.A.)**

Fred Eckhardt



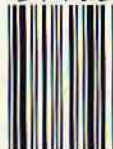
Fred Eckhardt is one of the Founding Fathers of modern homebrewing. Through his groundbreaking work, *A Treatise on Lager Beers* (1969) and his magazine *The Amateur Brewer*, Eckhardt helped to drag homebrewing out of the post-Prohibition Dark Ages into the modern era of scientific craftsmanship that it now inhabits. His 1990 book, *The Essentials of Beer Style*, offered the first concrete attempt to quantify the huge array of beer types brewed throughout the world. Now, in *Sake/USA*, Eckhardt brings the same steady hand and thorough research to the pursuit of sake, both here and abroad, at home and in the commercial sake brewery. Eckhardt provides a complete look at the history, traditions, and technical aspects of sake brewing as well as a guide to choosing and enjoying Asia's unique beverage.

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About This Book

This is a book about Oriental rice beers, mostly sake, and especially American-made sake. We have concentrated on two aspects: the story of sake in America, and how to make it and other Asian sake style beverages (*jiu*) at home. The book will tell the reader about the 36 American sake breweries in several states and towns of this country which have existed since 1902, and of not one, but two prohibitions that sake brewers have had to endure. The reader will also learn how to make sake at home, and in Japan that is illegal and we hope to encourage Japanese home brewers with these instructions.

Sake (USA)



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Sake (USA)

*The Complete Guide to
American Sake,
Sake Breweries
and Homebrewed Sake*
by Fred Eckhardt

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Dedication: This book is dedicated to the homebrewers of America, who in their industry and perseverance may change forever the image and face of Japanese Sake, simply by doing what has never been done before: brewing great and imaginative rice beers of types never before conceived. This book is also dedicated to the homebrewers of Japan, who we hope will have the courage to brew at home, and change the laws of Japan which do not at this time allow such enterprise. Hey, you Japanese folk, get busy; a law that doesn't allow homebrewed sake in the country of its origin needs to be changed. Go for it—brew sake all over Japan until the government realizes how ridiculous it is to stop such human enterprises. Let freedom ring across Japan. A country that takes such good care of its rice farmers should also let them brew.

THE COVER DESIGN

The simple design on the cover is the ancient form of the Chinese character for jiu. This style of presentation is called *ten-sho* or "seal" characters. They are the oldest style of writing used by the Chinese, Koreans and Japanese, "seal" because that is the style on the personal seals of all Japanese, and most Koreans and Chinese. In Japan at least, one's signature is not valid unless overwritten by the seal imprint. Ms. Rosalind Wang of the Portland State University Library located the character and helped me work out its use on the front cover of this book.



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酒

PREFACE

The Chinese character for sake (酒) has at least two pronunciations in Japanese. In fact, all Chinese characters used in Japanese writing have at least two, and often more, pronunciations. There's always a Chinese pronunciation plus a native Japanese pronunciation. In this case sake (pronounced SAH-kay) is the Japanese indigenous pronunciation, and SHU (rhymes with shoe), the Chinese pronunciation in Japanese. But that's not the end of it, because the word originally came from China, and the *Chinese* Chinese pronunciation used in China, is JIU, or sometimes CHIU, or even CHIEW (but it is pronounced *jo*, rimes with *go*, but the *o* is long as in *goh*). And, of course, there's the Korean pronunciation, which is JOO, or JU, (주) both pronounced the same way (as in *jew*), but as you can see, the character is different. The Koreans have their own way of writing, a style distinctively their own, but which derives from the same original Chinese character.

When we speak of sake, we are talking about the Japanese version, more properly called *sei-shu*, or refined *shu* (sake). It is "refined," that is clear, or clarified, and of a higher alcohol content than many indigenous Asian variations, which are often milky white in color, tinged with yellow. The character *jiu/shu* actually indicates a distinct alcoholic beverage in its own right, more properly defined as a beer, that is, a beverage made from cereal grains (usually rice). In modern China, Japan and Korea, however, this character has been associated with all alcoholic beverages, including western beer, western wine, and distilled liquors of both European and Asian origin.

In fact, this beverage type is unique and distinctive. In truth it is neither beer nor wine. I prefer the original Chinese word *Jiu*, as a generic term for all such

beverages. *Jiu* is neither beer as we know it, nor is it wine as we know that. *Jiu* is the best generic term, because sake is a *jiu*, but as noted above it is not the only *jiu*. When, in this book, I speak of sake in its many varieties I will use the word sake, when I speak generically about all of the Asian rice beverages or when I speak of the possibilities and variations of this type of ferment, I will also use "*jiu*."

酒

FOREWORD

Sake is the most complex alcoholic beverage on the planet, with the highest alcohol content (up to 21%) of any naturally fermented beverage. Beer has 5-8% alcohol (all alcohol content figures in this book are as volume, sometimes written "by volume" and sometimes "vv"), whereas table wine is 12-13%; sherry, the next strongest fermented beverage usually has about 15% alcohol. Vodka, and hard spirits can have up to 95% alcohol, but they are the result of alcohol concentration by distillation, rather than production by simple ferment. Sake has some 600 elements in its makeup, whereas beer and wine have only about 500, distilled brandy and whiskey only 400.

The commercial production of sake outside Japan is in itself a challenge, and indeed sake has been produced commercially in only four countries other than Japan. China/Taiwan has its own production of sake-like *jius*, but none are actually made quite like sake. There are Korean breweries which make a credible imitation, but only Brazil and the United States actually brew true sake. One Brazilian brewery has been in existence for some time, but there have been no less than 36 American sake breweries.

Now the American Homebrewer's Association has undertaken to provide for amateur sake judging, and the Kohnan Brewery of Napa, California, has agreed to sponsor that category for National judging by the AHA. This book is about American sake: history, production and sales; how to make sake in the home, and it also offers a review of sake's, American and Japanese, on the American market. The reader, who may become interested in a further study of sake, is urged to purchase a copy of *Saké, A Drinker's Guide* by Hiroshi Kondo^{(2)*}, published by Kodansha-Intern-

* numbers in parenthesis indicate references in the bibliography.
Appendix VI.

tional of Tokyo, and distributed in this country through Harper & Row, 10 East 53rd St., New York, NY 10022. Kondo covers an entirely different range of information, a rich mother-lode of data about sake in Japan, and I have tried not to duplicate his effort.

The recipes and procedures for making sake at home appear in book three. While they may sound complicated, they are not nearly as difficult as brewing all-grain beer or producing sparkling wine and sherry at home. I don't know that I would call it "easy," but since 1973 (my first batch), I've never had "bad" sake, although one batch was nearly ruined by my attempt to make a low alcohol version. (The stuff tasted OK but, at 13.7% alcohol, was rather insipid.) Establishing a careful time-table is the key to successful home production of sake.

Japanese sake brewers have always denigrated American commercial sake and American rice, yet the fact remains that most American commercial sake is quite acceptable, although (perhaps) not up to the highest "Special Class" Japanese sakes. That remains to be seen. American rice IS apparently inferior to the best Japanese rice, and perhaps even to that country's regular rice. That remains also to be seen. The actual problem (in my view) is that American rice growers have not become cognizant of the needs of the American sake industry. The American sake breweries have little communication with each other, and there is no equivalent of the California Wine Institute or the National Beer Institute. Until American brewer's can get together to set standards and establish their requirements, the rice growers will not even be aware of their existence.

Five of the current six American sake breweries are owned by Japanese companies, and one is owned by Japanese immigrants to this country. The brewers' don't really speak to each other or exchange informa-

tion and they seem unwilling or unable to get together on anything. The American sake industry is at a cross-road, and they need to join forces. I had a dreadful time getting simple information about various brands from two of the breweries. I was told that the specific gravity and acidity of their sake brands were "trade secrets!" This is information you and I can determine quite easily in our kitchens, and something that each of them knows about all the other brewers' sakes. So one must ask: who are they keeping secrets from? The answer is you and I, the consumer.

Sake homebrewing will be an asset to all of them, because it will popularize the beverage among the non-Asian American population, and hence broaden its base of distribution, and of course it will also broaden the knowledge about sake among a wider American population base. Maybe then, when you ask for sake in a restaurant, you won't get HOT sake automatically. Maybe sometimes they will offer it at room temperature, and ASK if you want it warmed. In a perfect world, there'd be no sake machines at all!

酒

INTRODUCTION

Sake (USA) has a three-fold message. A message about the joy of sake, about all of the Asian rice beer (*jiu*) possibilities, a short history of sake in America and the breweries that make it. There is a directory of present and past American sake breweries (there were, in fact, 36 different American sake breweries, six are still brewing, and one more planned). But it is also a treatise on the art of making *jiu*/sake at home, taking the mystery out of making *jiu* for all time. This year (1992) the American Homebrewers Association have added sake/*jiu* (and cider) to beer and mead as home-made alcoholic beverages which will be judged and awarded prizes for excellence in brewing.

What this really means is that the commercial production of *jiu* will be encouraged in ways that may astound Chinese- and Japanese-Americans. One thing is certain: American homebrewers will experiment with types of *jiu* that their Asian neighbors will probably not recognize. There will be herbal *jius* that the Chinese have never dreamed about. There will be sake Champagne, fruit *jius*, strong sakes, weak *jius* and weird varieties never before tried. I expect there might even be mead *jius* and cider *jius*, and you can bet someone will try hopped sake, but of course, the Chinese did that centuries ago⁽⁷⁾.

Somewhere, someone will open a sake pub-brewery, and that will signal the start of a whole new phenomenon, and who knows where it will lead. American homebrewers have changed the face of American beer forever, and they will do the same for *jiu*/sake, and you may be sure the Canadians will not be far behind. The really interesting thing about all this is that it could only happen here. The Japanese sake brewers are tradition bound, and are reluctant even to bottle their product in smaller volumes to say noth-

ing of producing sake champagne, or raspberry sake. The Chinese, ever xenophobic about their food, would never think to brew any of the good Japanese sake styles. The Koreans love sake, but have an antipathy towards all things Japanese. They are also unwilling to experiment with what is, after all, their heritage, too. The Europeans, of course, will be far behind in this venture, for they are no better than the Japanese when it comes to tradition. But who knows, perhaps there will be a German or Italian sake brewery coming around one of these days. Only in this country will there be the type of wildly free experimentation that only homebrewers will think of. Watch out world, American *jiu* is on its way!

This book will probably be illegal in Japan. We tell the reader how to make the stuff, and that is *verboden* in Japan. I am hoping we can encourage a lot of illegal brewing in that country. When the methods and procedures of making alcohol are available everywhere and in every language, then the infamous prohibition of alcohol will be impossible. If there had been as much public information on beer and winemaking in the public domain as there is now, you can be assured that Prohibition would have been a colossal failure in two or three years instead of fourteen.

Incidentally, Japanese alcohol laws are almost as strange as our own. The brewers of sake (there are 2700 in Japan) are fairly well protected, as well they might be, but in the production of regular (European-style) beer, only a large brewing company (there are only four of these in Japan) can open a micro-brewery or a pub brewery. In Japan you have to be a big brewery to operate a small brewery!

Today, in Japan, the sales of sake are going down, because young Japanese are more interested in other beverages, but if homebrewed sakes were being made,

you can be sure that sake sales would be going up instead of down. One simply cannot brew beer, wine, or sake at home, and not be interested in the commercial variations on the market. Most homebrewers have doubled their consumption of commercial beer since brewing their own, and the same will surely be true when they start making *jiu*.

Actually, I am quite pleased with myself for writing this book, it opens a whole new avenue of fun and experimentation at home. I hope you enjoy. To paraphrase my friend Charlie Papazian, president of the American Homebrewers Association, let me urge you to start brewing, and then, "Settle back, cease worrying, and sip some homebrewed sake!" Sake sippers of America, unite, the world eagerly awaits your efforts.

JAPANESE PRONUNCIATION GUIDE

Japanese is very simple (well almost so) to pronounce. The whole language is based on only 48 (+1) syllables. I won't try to delve into the variations of speech, but only a little basic information. There are 5 vowels only: "a" pronounced "ah" as the o in holiday

"i" pronounced as the "ee" as in feed

"u" pronounced as the "oo" as in food, but the "u" sound is almost always slurred over very fast so that one rarely hears it pronounced carefully. Thus the word *su-ko-shi* (a very little bit) is usually pronounced *s'KO-shi*.

"e" pronounced as the "e" in bed.

"o" pronounced "oh" as the o in don't.

Sometimes there are long vowels, such as the long o sound in *gô* a Japanese unit of measure (about 6.1-ounces).

The consonants are mostly pronounced as they are in English, except for the "h" series: *ha hi hu he*

ho, in this case the *hu* is sounded as almost an *f*, a soft *f*. There are other variations, but this is not the place to explore the Japanese language. I mention the above so that you won't sound like a fool when discussing sake with someone who knows Japanese pronunciation. Some common words found in this text:

sake pronounced SAH-kay

koji pronounced Koh-jee

See the glossary for further pronunciation notes.

The Chinese words are the difficult ones to pronounce correctly, so I won't even go into that area.

SAKE CONNECTION NEWSLETTER

To keep the reader up to date with what's going on in sake I have started a newsletter called *The Sake Connection*. This is the only such newsletter printed in English. I have made every effort to have a copy delivered along with this book (U.S. sales). If you didn't get one, send me a note, but first read the following:

As I said in the first issue of *The Sake Connection*: "I don't know what it will develop into, or whether it will even develop. At best it will be irregular."

Cost for four issues postpaid is \$8. Subscription is by billing only, AFTER you receive four issues. If you (at that time) are not interested, just ignore that notice, and I'll remove you from the list. You have no other obligation to me in this matter, nor I to you. You must register by sending a postcard or notice (don't send money, and don't call me about that) to:

SAKE CONNECTION

P.O.Box 546

Portland OR 97207

Cost for four issues, postpaid \$8. Subscription is by billing only, AFTER you receive four issues.

BOOK ONE
SAKE HISTORY—LORE—
TRADITIONS

酒

CHAPTER ONE

A GREAT EASTERN TRADITION

Sake is probably the least understood of all alcoholic beverages. Most of us know how alcohol is produced. It is the result of a ferment by yeasts acting on natural sugars, which produces alcohol and carbon dioxide as by-products. Sake is usually thought of as rice wine, but it is more accurately a beer, since it is made from fermented cereal grains (rice). But rice is mostly starch, and that is not directly fermentable by yeast. Therein lies the mystery.

Japanese sake is the best known example of a whole class of oriental rice beers (Chinese: *Jiu*; Japanese: *Shu*; Korean: *Joo*), encompassing a wide range of distinctive styles.

THE CEREMONY AND RITUAL OF SAKE

Sake, like most things Japanese, is surrounded by ceremony and ritual, lore and mystique.

One never drinks sake alone. Indeed, the Japanese, the Chinese and the Koreans too, have made an art of eating and drinking in company. There was no word in either Chinese or Japanese denoting solitary drinking. Nevertheless, there are ways, as the Chinese poet Li Peh (622-762 AD) noted:

*A flask of wine alone amid the flowers,
No friend have I to keep me company,
But as I lift my cup, the moon peeps out.
It and my shadow make the party three.*

We all know the confirmed drinker will have his way. Incidentally, a good Chinese poet was expected to be able to down a hundred cups of *jiu* at one sitting. They were small cups, but....

OSHAKU

In the old Japanese sake tradition, one never poured his own. This was usually done by a companion, and always to the brim. Even today, on the more important occasions, there will be a waitress, serving lady or, under some circumstances, a Geisha. The sake cup is held by the recipient while it is being filled. This is called *oshaku*. When you see someone's sake cup is low, you give them *oshaku*, to the brim. Years ago I had the privilege of attending a traditional Japanese Shinto-style wedding. In addition to the "nine sips", without which no Japanese considers himself/herself married, there was a large and festive dinner party. I was fascinated by watching one gentleman, in particular. His wife dutifully gave him *oshaku*, time after time after time. She poured for him, in fact, until he passed out. Such dedication! Sadly, in modern Japan, *oshaku* is a fading tradition.

As a ceremonial drink, sake is taken on all important occasions. Flakes of gold, added to the beverage, are supposed to increase one's vitality, while chrysanthemum petals are floated in the cup to prolong life. Viper soaked-sake is said to increase one's virility. Theater fans send it to actors on opening nights of the theater much as we send champagne, and some of the seedier actors will rent empty sake casks for display, just in case no one sends them any.

Originally, sake cups were made of lacquered wood, rather large, relatively shallow, saucer-like containers. These went out of style, we are told, when one samurai, with his head in a sake bowl at the wrong time, lost same. These days, the lacquered bowls are

reserved for ceremonies such as weddings and funerals. There are also sake cups, almost the size of tea cups, with the forty-eight different "pillow-pictures" on the bottom, these presumably for lovers, and at a certain fertility festival near Nara, there are specially designed, penis-shaped cups. I have two sake decanters shaped like a combination penis-vagina, and two small penis-shaped cups to match.

THE ANCIENT ORIGINS OF JIU

The original production method was to chew the cooked rice grains and spit them into a common vessel. The enzymes in saliva converted the starch into fermentable sugars, and natural yeasts completed the fermentation process. In a similar manner the ancient Mayans, Incas and other North and South American native peoples made brews from corn and other grains. In Africa the method is still used, and the ancient Polynesians prepared their sacred drink kava by having virgins chew the kava root. (Virgins were a popular source of labor in these matters, and it may have had more to do with using children because they had better teeth, and because little girls were probably easier to control than any other people in the society.) The Chinese developed various forms of *jiu* made from rice, wheat, millet, and other cereal grains. (They were also the first to tax alcohol (ca 140 BC) along with establishing the regulation and codification of laws concerning its manufacture and use; and of course, they invented prohibition, too, along with the repeal thereof.

The 15th-century Italian adventurer Marco Polo may have been the first Westerner to sample *jiu*. He wrote of it as "a liquor which they brew of rice with a quantity of excellent spice in such fashion that it makes a better drink than any other kind of wine; it is not only good but clear and pleasing to the eye and being very hot stuff it makes one drunk sooner than any other wine."

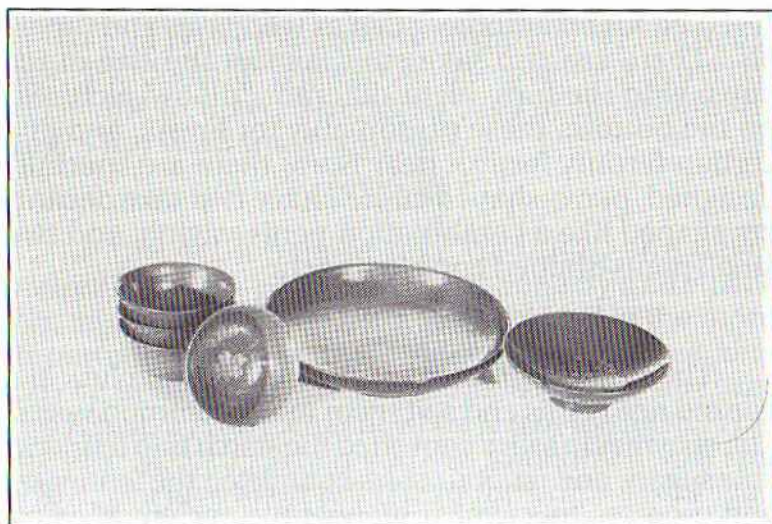


Fig 1.1. Lacquered wood sake cups.



Fig. 1.2. Tokkuri and choko, Tokkuri on left whistles when one pours from it. Matching cups (choko) hold 1.5 ounces.

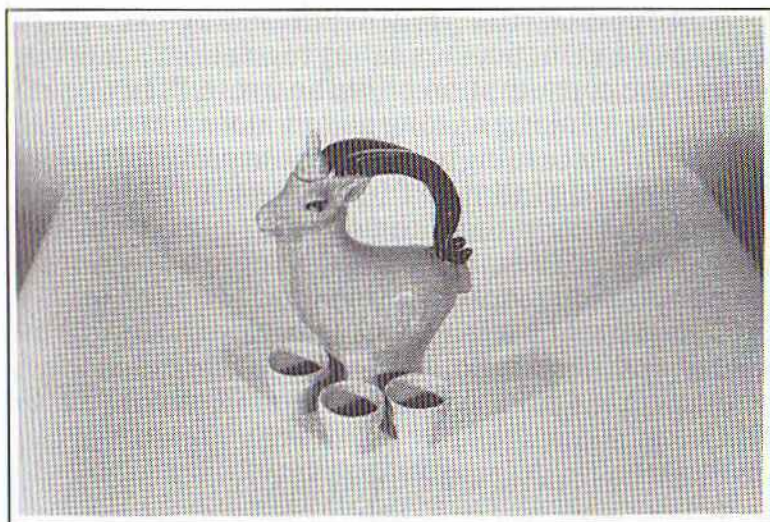


Fig. 1.3. Chinese service.

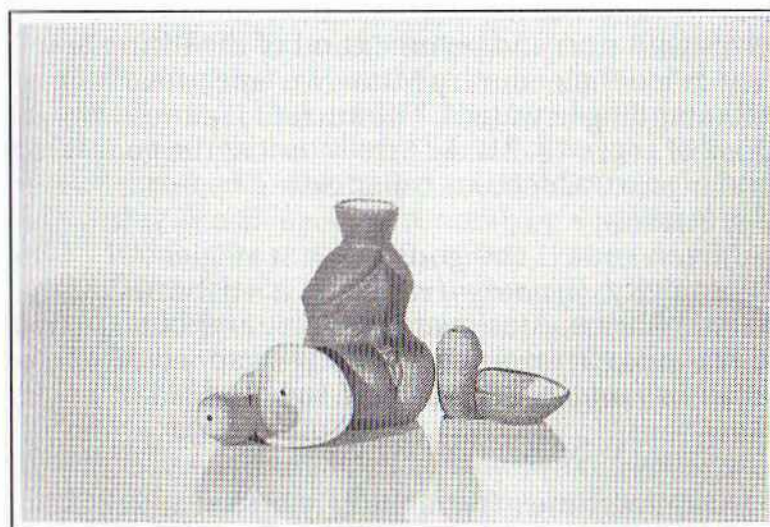


Fig. 1.4 Sake service, sex set.

Confucious, the great Chinese sage set forth numerous and meticulous eating regulations, but concerning the consumption of *jiu*, he wrote, "There is no limit to *jiu* drinking as long as one does not become disorderly." According to one Chinese proverb: "When drinking among intimate friends, even 1000 cups are not enough." And the Chinese poet Li Bo (T'ang dynasty) wrote: "The rapture of drinking, and *jiu*'s dizzy joy, no sober man deserves to enjoy."

Professor Li Ch'iao-p'ing⁽⁷⁾ provides a wonderful history and description of ancient Chinese alcohol production methods in his book *The Chemical Arts of old China*.

JAPANESE LEGEND

Japanese legend has it that sake is "dew formed on (sacred) Chrysanthemum flowers, and when drunk results in happiness, abundance and long life." From the earliest times the Japanese have identified themselves with rice, and before "Land of the Rising Sun," they called their country *Mizu-Ho*: "spearhead of rice stalk standing in water." The ancient Japanese *Kojiki*, (*Book of Legends*), 712 A.D., tells us that the gods were fond of sake, which was called *Sakae no mizu*, "water of prosperity."

Even today, the gods are not neglected. The Shinto deity, *Oyamagui no kami*, is enshrined at the Matsuo Shrine, Arashiyama, Kyoto, and outside this edifice are long rows of huge, straw-wrapped sake kegs called *komodaru*, a remarkable sight indeed.

SAKE APPRECIATION

Summertime may be the very best of all sake seasons. The Japanese are fond of viewing flowers, stars, or the moon, and sipping sake very slowly.

In the warmest seasons sake is drunk chilled or at room temperature, from *masu*, small square cypress

or lacquer-ware measuring boxes. The cypress boxes add a touch of flavor to the sake, and make a very refreshing difference. This is one of my favorite ways to finish a warm summer evening, using the sake, often (but not always) chilled, as a digestif.

Japanese restaurants often place a pinch of salt on the edge of the box. This is another subterfuge—the salt is called “*sakana*” (sake snack), in effect, food, so one does not have to drink without eating! Sometimes I place the sake bottle in the freezer; when the sake is mushy with ice crystals it is especially delicious. Sake is a wonderful summer drink, and of course one can mix it with wine or hard liquor, too. It tastes just fine in chilled wine glasses, or in small brandy snifters, where the delicious bouquet can best be appreciated.

HOT SAKE?

In this country, most Japanese restaurants serve their house sake from the so-called “sake machine.” The sake machine allows them to dispense sake from 18-liter boxes. This makes sake a very big money maker, because the serving size is often as little as three ounces. That amounts to over 200 servings at something like \$3 each, \$600 total, or a profit of well over 1100%. These are truly infernal machines that keep sake much too hot over very long periods of time, and (I’ve been told) they are nearly impossible to clean. Unfortunately, Americans (even those of Japanese ancestry) think sake should be served at tea temperature, and would likely complain if they were served luke warm sake, especially when they expect “hot” sake. The serving temperature is much abused in this country. To make matters worse, the average Japanese-American restaurateur makes little, if any, effort to educate himself, his staff, or his patrons about proper serving temperatures for sake. In any case, if

the sake container is too hot to hold, send it back, as it is far too hot to drink. Around here the Vietnamese restaurants are serving sake at very proper temperatures, and they've never even heard of those infernal sake machines.

Sake is delicious when it is served lukewarm. The correct temperature (104-110°F/40-43° C) is only a little warmer than your blood. Ask for your sake *nurukan o kudasai* (lukewarm please). You check the temperature by spilling a few drops on your wrist just as you would the baby's formula. In the old days, the correct temperature was called "*mo hito hada*." Another person's skin—specifically, another person of the opposite sex's skin. Where? Make a guess!

At any rate, the correct way to attain this temperature is simple. A small sauce-pan of water is brought to a boil, and then removed from the heat. The small sake decanter (*tokkuri*), is placed therein, until the proper temperature is reached. These days a restaurant might use a micro-wave to warm the sake to a reasonable temperature. The *tokkuri* is a small earthenware or porcelain bottle of about 3- 4-oz capacity, usually filled (if not from the "machine") from a large, family sized bottle (61-oz/1.8-liter). Sake is usually drunk from tiny cups called *sakazuki*. The *sakazuki* holds about an ounce. It is always sipped slowly. In Japan, the proprietor or serving person will always ask if you want your sake warm or cold.

The only way to appreciate sake in an American Japanese restaurant is to ask for a specialty brand not served through a sake machine. Ask for a lesser-known non-machined brand, such as the Japanese country sakes discussed later in the book.

The traditional method of packaging sake is also quite fascinating. The sake keg is a large cypress barrel, called *hyotaru*, which holds 72-liters (19-gallons), although there are also smaller "party kegs," (36-, 18-, 9-,

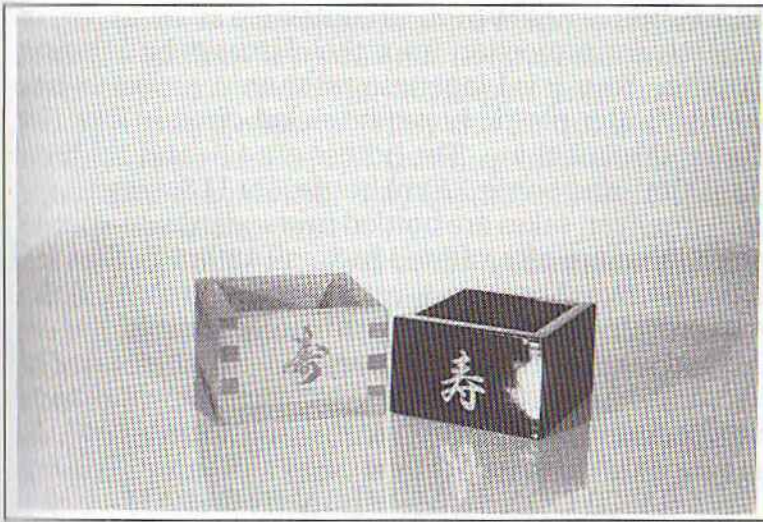


Fig 1.5. Wood and lacquer masu. The masu holds chilled or room temperature sake, and a pinch of salt on the rim as “food.”

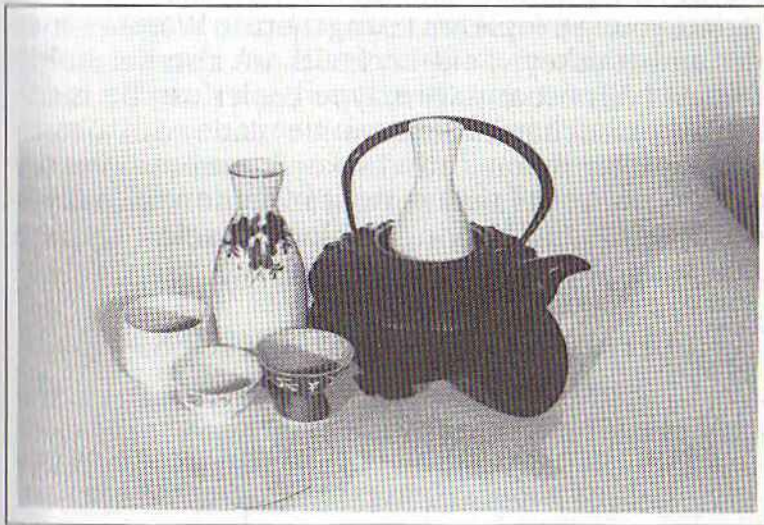


Fig. 1.6. Sake vessels set for heating. Kettle water is brought to a boil and then the tokkuri is placed in it, where it is allowed to warm to about 115°F/46°C.

and 4.5-liter). These beautiful containers are wrapped in rice straw for protection from the elements and during shipping. Your local Japanese restaurant probably has sake in 18-liter plastic boxes funneled directly into the infernal sake machine. The bottles are 4.5- and 1.8-liter, plus 900ml, and some 720ml bottles for U.S. consumption. American sakes are bottled in standard wine bottle sizes. Some are also offered in small 180ml bottles for single servings. These are great for sampling some of the more prosaic brands, but unfortunately, most of the really good sakes are not available in such small and useful quantities. An exception is the excellent **Sawanotsuru Genshu**, found in 120ml bottles in some areas of the U.S.

SAKE CONSUMPTION IN JAPAN

Today, in Japan, less sake is being drunk, and the ways of drinking it are also changing. While it is still drunk in the traditional manner among the older generation, young people are taking more to Western-style beer and whiskey. Sake cocktails are also becoming popular. Almost any wine-type cooler can be made with sake, and hard drinks can be made with a combination of vodka or gin and sake. Some examples are sake on the rocks with a twist of lemon; swokka—vodka, sake, and lemon, or bloody sacks—tomato juice, sake and ice.

JAPANESE DRINKING PLACES— NOMIYA AND IZAKAYA

The Japanese equivalent of the bar is called *Nomiya* (drink shop). These establishments are usually characterized by a large paper lantern hanging outside. All classes of people (mostly men) will be found in them. The businessman and salesman will rub elbows with taxi drivers, fish vendors, and univer-

sity students. The ranking here is more closely associated with how long one has been a customer, rather than one's station in life. Most *nomiya* are small, tidy, well-lit little places, but they can be quite noisy, with loud singing and much carrying on. Women rarely patronize the *nomiya*; they are more likely to frequent lounges or tea rooms.

Many Japanese (and other Asians), are allergic to alcohol, and with only one or two drinks they turn beet-red. Moreover, public drunkenness is not usually frowned upon, although the government is cracking down hard on drunk driving. Pub crawls—called *hashi-goza* (sake bridge)—are popular, and occasionally one sees groups of boisterous men staggering up the street to the next shop.

Best of all are the *Izakaya* ("sit-down sake shop"). These are sake tasting shops, often small and cozy, where one may sample a variety of sakes (up to 15-20), at one sitting. *Izakaya* are becoming popular in some large U.S. cities, such as New York and Los Angeles, where (I've been told) there are about 50 of them. There's a pub in San Francisco called *Noc Noc* on Haight Street, which specializes in sake and sake drinks, but the music is loud, so one needs to visit late in the afternoon when it may be a little quieter.

HOW SAKE AND JIU IS MADE

Traditionally, sake is first brewed each season in early winter, after the new rice crop is harvested, because a cold ferment is necessary to insure protection against bacterial contamination, and because the fresh rice makes better sake. Most small modern sake brewers use a process similar to that described in some of the oldest books, such as the *Tamon'in Nikkei* (ca 1599), which even described pasteurization (*hi-ire*) at 140°F (60°C). The process today is almost identical, allowing for only a few modifica-

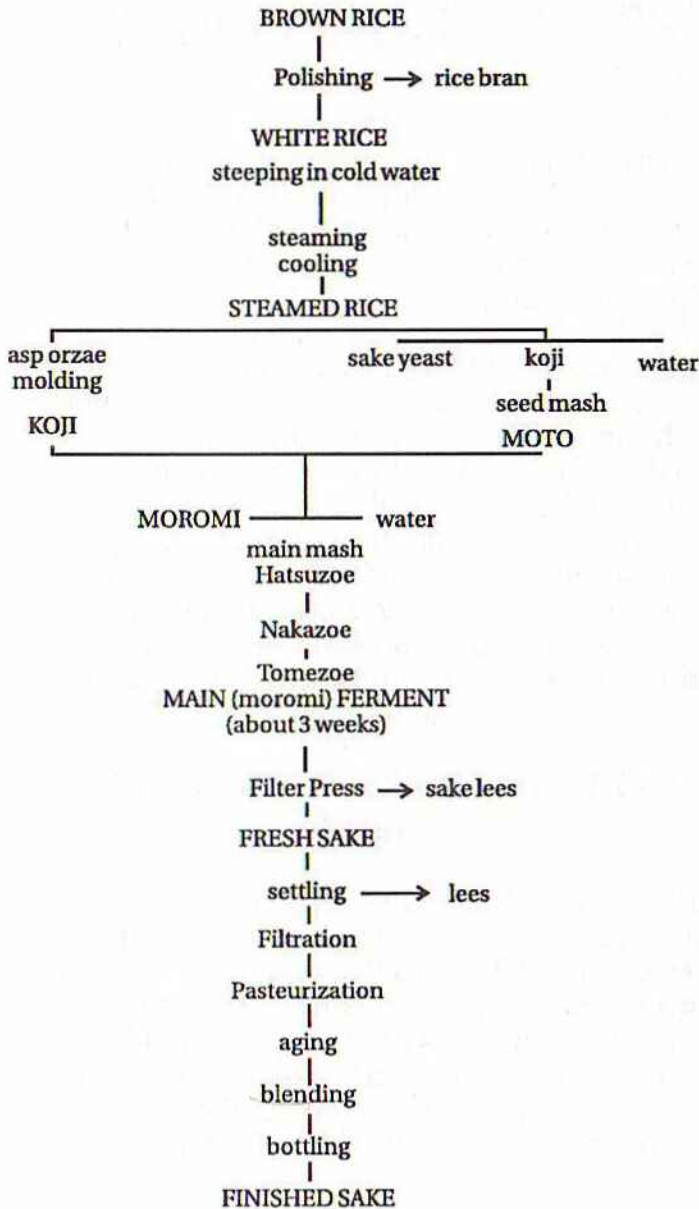
tions and improvements from modern technology. In the old days, the brewmaster (*toji*) and his crew were locked away for the whole production season—no days off for them—until the last brew was finished and packaged. Pasteurization may have been used as early as the eleventh century in Japan, but it is not a Japanese invention, the Chinese beat them to it by at least 500 years ⁽⁷⁾.

The production of sake begins with the making of *Koji*. *Koji* is rice which is incubated with *aspergillus oryzae*, a mold similar to penicillium.

When the *koji* is ready, sake production may begin. First the polished rice is soaked and then steamed, after which it is allowed to cool. A mixture of rice, *koji*, and water is added, along with special sake yeast. The main or primary ferment (*moromi*), takes three days, after which successive mixes of rice and *koji* are added, each doubling the size of the ferment, so that by the fifth day (the third such doubling) the main or *moromi* ferment is at its height. The *moromi* buildup is followed by a second long, slow, three week ferment at around 50°F (10°C). The *koji* converts the starches in the rice grains to sugar, which is almost immediately fermented to alcohol. This ensures a very strong and potent product with up to 20% alcohol, (by volume). At that time the young sake is pressed, separated from the grains, and filtered. The clear sake is then pasteurized. Pasteurization is very necessary to prevent bacterial damage to the final product. Sake is aged in the brewery for up to six months, or even a year, but most sake brewers claim it does not improve much with age. Sake is light sensitive, and must be protected from light. Dark amber glass is most effective, as it is with European style beer.

酒

Sake Production Flow Chart



CHAPTER TWO

JIU AND SAKE TYPES

New Japanese regulations⁽⁴¹⁾ codify the brewing process by defining three types. Two of these define whether or not the brewer may fortify the product by adding alcohol: 1) *Jummai* sake (the only kind allowed into the U.S.) may be brewed only from rice polished to at least 70%, and may not be fortified; 2) *Honjo-zo* sake may be fortified (up to 25% of total alcohol), but must only be made from rice polished to at least 70%. A third type, *Kinjo* or *Ginjo* sake may be brewed only from rice which has been polished beyond 50% of its weight. Such sake may be *jummai* or *honjo-zo* in Japan, but *ginjo* sake imported into the U.S. may not be fortified (see above). In this manner, the Japanese Government regulates the use of raw materials and additives, dictates that rice be the only cereal used in sake brewing, and determines to some extent how much the rice must be polished.

COLOR IN SAKE—WHERE DOES IT COME FROM?

Two factors effect the color of sake, which ranges from very pale yellow to nearly colorless. Most important is the polishing level of the rice. The level to which rice is polished has a direct bearing on the amount of starches which are converted to fermentable sugars by the koji, and the amount of protein and crude fat. The more rice is polished, the less color it produces in the finished product. The really fine sakes are almost colorless.

On the other hand there is the charcoal filtering done to most sakes. A nearly colorless, but inexpensive sake will simply have had more of its goodness charcoal-filtered out—in rather the same way that American lager beers are over-filtered to remove much of the essence which gives it flavor. Thus colorless sake can be both good and bad, probably depending on the price you pay.

DRY/SWEET BALANCE

Another major variation in all sakes is the sweet/dry balance of the finished product. Body and sweetness are enhanced by adding part of the rice at end of the main ferment, which has the effect of adding body to the sake because at that point the koji has had its enzymes depleted, and the yeast will be near its maximum alcohol tolerance, the unfermented portion of riced will generate dextrins (special starch-sugars) to soften the dryness of the finished product.

The Japanese rate their sakes according to the level of dryness or sweetness, and this information is sometimes available to the consumer. The dry/sweet balance is determined by measuring the finished sake with a special hydrometer called a sake meter. The sake meter value (SMV) of the sake is a Japanese measurement based on the degree Baumé (1 Baumé = 10 SMV), similar to measurements used in the U.S. and European brewing and winemaking industries. Sake Meter Values are positive when the beverage is dry, and negative when the beverage is sweet. Specific gravity of dry sakes is below that of water (because of the presence of alcohol which weighs less than water), while that of sweet sakes is more than that of water (1.000).*

* See Appendix V for a description of Sake Meter Values, and their relationship with specific gravity.

When Japanese sake brewers discuss the sweet/dry balance they use some terms you might come across. These are as follows:

Chôkarakuchi, extra dry, that is SMV +12 to +15, which would be s.g. 0.9917 to 0.9896 (i.e. -1.2 to -1.5 degree Baumé).

Ohkarakuchi, very dry, SMV +6 to +12, that is sg 0.9959 to 0.9917.

Karakuchi, dry, SMV +1 to +5, sg 0.9993 to 0.9965
Yaya karakuchi, medium dry, SMV +1 to -1, sg 0.9993 to 1.0007.

Nakani, mild, SMV -1 to -3, sg 1.0007 to 1.0021

Yaya amakuchi, medium sweet, SMV -3 to -5, sg 1.0021 to 1.0035

Amakuchi, sweet, SMV -5 to -10, sg 1.0035 to 1.0069

Ohamakuchi, very sweet, SMV -10 to -16, sg 1.0069 to 1.011

JIU PROFILES

In my book, *The Essentials of Beer Style*, I gave data on the various beer types in what I called "profiles." They proved to be the most popular information the book provided. We have developed a similar system for jiu. These profiles will include the following information:

1. Name of the sake, jiu or joo and country of origin (if no country is listed, the sake is American).
 2. Year of the profile's information or analysis.
 3. ABV%: Alcohol content by volume.
 4. SMV/s.g.: Sake meter value/specific gravity.
 5. Acidity as ppt succinic/acidity as pct tartaric.
- Acidity has a profound effect on the way sweetness is perceived. The Japanese use parts per thousand (ppt) as succinic for their acid standard, but American professional and amateur winemakers, use acidity as per-

cent (pct) tartaric. Homebrewers and winemakers can purchase acid titration kits from their local winemaking or beermaking supply store.

6. A note regarding color, the final item in the sake profile. The figure is a percent of the color of 1 drop of yellow food dye added to 2-liters of water. I call this color 1 (100%). Place a glass of it beside your tasting glass and compare color. Most commercial sakes will range from 0.15 to 0.5 (15-50%) in color depth by this comparison. *Moromi* and *nigori* sakes will be milky white possibly tinged with yellow. The Chinese *huang jiu* (amber *jiu*) will be much darker and is simply noted in that fashion, i.e., light, medium, or dark amber, or whatever you judge it is judged to be.

An "n" at any point simply means I have no information on that particular aspect. The profile is presented as follows:

ABV%	SMV/s.g.	Acidity	color
Gekkeikan Original Sake 1991:			
16%	+2/0.9986	1.5/0.21	0.1

Translation: American made Gekkeikan sake had this profile in 1991: 16% alcohol by volume, a dry sake (*karakuchi*) with a sake meter value +2/specific gravity 0.9986, with 1.5 ppt acid as succinic/.21% as tartaric, and a color 10% of the standard.

THE SAKE TYPES AND SOME PROFILES OF PARTICULAR BRANDS

The Japanese produce a number of more or less distinct sake styles. These are not particularly definitive, more like the variations in American lager beers. Water, the rice quality, and the amount of polishing that rice receives are the major variables in sake production. In 1975 and in 1982, the Japan Sake Brewers Association (JSBA) established some rules about labeling standards for Japa-

nese sakes. Kondo⁽²⁾ has detailed some of these requirements. We will designate an asterisk (*) where the JSBA (or the Japanese government) has established standards for a particular type. Where there is no asterisk, the description and/or designation is either not defined by JSBA, or I have redefined it myself, according to the needs of this book.

Jummai-shu* is any sake made only with rice, koji, yeast, and water. The Japanese equivalent of the all-malt beer.

Honjo-zo* is sake which has been fortified with added alcohol.

Genshu Sake*, is undiluted sake at full strength, about 18-20% alcohol, and these are among the better tasting sakes.

PROFILE

<i>ABV%</i>	<i>SMV/s.g.</i>	<i>Acidity</i>	<i>color</i>
Sawanotsuru Genshu 1984 (Japan):			
18.7%	+2/0.9986	1.9 ppt/0.27%	0.2
California Ki-Ippon Premium Dry 1991:			
18.5%	+5/0.9965	1.7/0.24%	0.2.

Regular Sake has about 17% alcohol. Analysis of Japanese sakes from 1905 (69) show an interesting contrast/similarity to modern day sakes, as we can see by comparison with those below.

PROFILES

<i>ABV%</i>	<i>SMV/s.g.</i>	<i>Acidity</i>	<i>color</i>
Japanese Sake I 1902 (13):			
14	+4.5/0.9934	0.8/0.11	1.0
Japanese Sake II 1905 (69):			
17.2	+6.5/0.9955	1.5/0.21	1.0
Japanese Sake III 1905 (69):			
16.9	+15.65/0.9892	1.4/0.20	1.0

(their color was as Rhine Wine, about 1 (100%) on our color scale).

The author (63) described those sakes as having a very pleasant taste, "mild, though somewhat bitter and tart; while its aroma is very peculiar and exceedingly delicate....[served] in porcelain jars in which it is heated to 45C [113F] before coming on the table; in the place of glasses, small conical cups of porcelain are used. If drunk warm, it is better than cold." This would be a good description of our homemade sake (Book Three).

MODERN PROFILES

<i>ABV%</i>	<i>SMV/s.g.</i>	<i>Acidity</i>	<i>color</i>
Japanese Sake IV 1957 (Japan):			
16.5	+3/0.998	2.4/0.34	n.
Kiku Masamune 1983 (Japan):			
17	+3/0.998	1.7/0.24	n.
Sawanotsuru 1984 (Japan):			
17	-2/1.00137	1.8/0.25	n.
Takara Masamune Hawaiian Sake 1983:			
17	±0/1.000	1.7/0.24	0.75

Ordinary Sake (my terminology) has about 15-16% alcohol.

PROFILES:

~ indicates a Jizake—country sake

<i>ABV%</i>	<i>SMV/s.g.</i>	<i>Acidity</i>	<i>color</i>
California Ki-Ippon Sake Dry 1991:			
15.5	+3/0.9998	1.7/0.24	0.1
Chiyoda Sake 1984 (Japan):			
16.5	-1/1007	1.8/0.25	0.5
Fuji-Yama Sake 1973 (Shirayuki-Japan):			
13.9	±0/1.000	1.8/0.26	n.
Gekkeikan Original Sake 1991:			
16	+2/0.9986	1.5/0.21	0.1
Gekkeikan Sake 1984 (Japan):			
16.5	±0/1.000	1.6/0.32	0.15.

Hakusan Sake 1991:			
16	+3/0.998	0.9/0.13	0.3.
Hakutsuru Sake 1987 (Japan):			
16	+1.8/0.9988	1.7/0.24	0.5.
~Hanaharu ('Spring Flower') 1985 (Japan):			
16.5	+5/0.9966	n/n	n.
~Harushika Chookarakuchi ('Deer in Spring') 1985 (Japan):			
16.5	+12/0.9917	n/n	0.3.
~Hitori Musume ('The Daughter') 1984 (Japan):			
16.5	+1/0.9993	1.5/0.21	n.
Ichidai Sake 1983 (Japan):			
16	-0.5/1.00035	2.1/0.3	0.5.
Kamitaka Sake 1985 (Japan):			
16	±0/1.000	n/n	n.
~Masumi ('Very Clear Sake') 1983 (Japan):			
16.5	+3/0.998	1.5/0.21	0.2.
Momokawa Komedake Jummaishu 1992 (from Japan):			
15.5	+5/0.9966	1.6/0.23	0.
~Otokoyama ('Male Mountain') 1988 (Japan):			
16.5	+8/0.9945	1.6/0.23	0.2.
Ozeki Sake 1983:			
16.5	±0/1.000	1.7/0.24	0.5.
Shirayuki Sake 1984 (Japan):			
16.5	+1/0.9993	2.1/0.3	0.75
Sho Chiku Bai Go Kai Sake Dry 1991:			
16	+4.8/0.9967	0.9/0.13	0.4
Sho Chiku Bai Sake (Japan) 1973:			
16.5	-6/1.004	1.8/0.26	0.4
Sho Chiku Bai Sake (Japan) 1981:			
16.5	-1.5/1.001	1.8/0.26	0.4
Sho Chiku Bai Sake 1991:			
16	+2/0.9986	1.06/0.15	0.4

Sake (USA)

~Suishin ('Better Spirits') 1983 (Japan):

16	$\pm 0/1.000$	1.8/0.25	n.
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Taiho Sake 1991:

15	+1/0.993	1.7/0.24	0.1
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Kinjo (Ginjo) Sake.* Really premium (**Ginjo-zo**) and super premium (**Dai Ginjo—Dai Kinjo**) sakes are made from highly polished rice, and Japanese government standards require at least 50% polishing. This level of sake is extremely expensive to make, using up to three times the rice called for in ordinary sake. It is pertinent to note that only the most expensive highest quality rice can be polished to this great extent. These sakes are not cheap, but they are exquisitely delicious, the very best of all sakes.

PROFILES:

ABV%	SMV/s.g.	Acidity	color
Ozeki Premium Ginjo 1991:			
16	+1/0.999	1.3/0.18	n.

Momokawa Dai-kinjo 1992 (from Japan—honjo-zo—fortified):

15.5	+5/0.9966	1.3/0.18	
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ADDITIONAL SAKE TYPES

Moromi Sake (our definition), is unfiltered, and taken from the line near the end of the *moromi* (main) ferment. This leaves a lot of milk-like suspension in the sake, which gradually settles, to form a white cloud of fluffy sediment in the bottom half of the bottle. This sake is very young, a little sweet, somewhat fruity and with a slightly bitter aftertaste, but quite delicious. When bottled, it is called Nigori-sake.

Nigori-zake* (15-18%), is only lightly filtered and usually unpasteurized, but taken a little later in the process than *moromi* sake. *Nigori* means "impure," but use of the term has no negative connotations and

it is better translated as "cloudy." Although bottled, only a few are found on the American market. I've located only the two listed below as profiles. Unpasteurized, they cost a little more than the regular. The Ki-Ippon brand is sometimes frozen until it is to be used (mostly in Japanese restaurants, where it is especially popular in Florida). It is best to drink this type of sake very well chilled, moreover, freezing doesn't seem to do it any harm.

PROFILES

ABV%	SMV/s.g.	Acidity	color
California Ki-Ippon Nigori 1991:			
18.5	+5/0.9965	1.7/0.24	milky white.
Sho Chiku Bai Nigori Sake 1991:			
16	-20/1.013	1.06/0.15	milky white.

Ki-Ippon* is a brand (above) in this country, but in Japan, the JSBA defines it as *jummai* (all rice) *genshu* (undiluted) sake produced entirely in a single area, something in the nature of an appellation.

Koshu Sake* "old" sake, aged for two to three years, and **Hizo-shu*** even older, aged for five years. These would mostly be of the *Ginjo* style described earlier. I have not found any of them in this country, but the Takara people had a brand called "Koshu" which was (to my knowledge) not aged any more than regular sake; it is no longer produced.

Nama Sake is unpasteurized, often (but not always), weaker in alcohol (14-15%), and with a short shelf-life. It must be stored carefully, and drunk soon, as it is subject to bacterial infections and other problems, but it is refreshing and interesting just because it has not been pasteurized. It should be drunk chilled. *Nama* sake is sometimes labeled as "mild" sake when the alcohol content is kept low.

Sake (USA)

PROFILES:

ABV%	SMV/s.g.	Acidity	color
Gekkeikan Draft 1991:			
15	+3.5/0.9976	1.5/0.21	0.1
Hakusan Mild Sake, 1991 (our analysis):			
14.5	+3/0.998	0.8/0.11	0.2
Sho Chiku Bai Nama Sake 1991:			
15	+5.6/0.9964	0.7/0.10:	0.25.
Ozeki Dry Sake 1991:			
14.5	+3/0.998	1.5/0.21	n

Some of the other sake variations (light sake, and sake made for serving on ice “rocks”) seem to be watered-down versions (14-15% alcohol) of very ordinary sake. They are not particularly interesting. The Japanese have also made Chrysanthemum flavored sake, and gold sake, which has gold flakes in it. Both Japanese and the Chinese have made “Viper” *jiu*, with a small snake in the bottle. The taste of the sample I tried is very hard to describe. I don’t think it will ever be a favorite of mine. It is considered an aphrodisiac in Asia.

Kijo-shu* is made by replacing half of the water in the ferment with finished sake, producing a strong, sweet, and heavy drink. According to Kondo⁽²⁾, it is usually served as an aperitif.

Rice Wine although technically not a wine it carries that label in this country. Sometimes this is weak sake, made to table wine strength, about 12% alcohol, but some brewers actually produce their wine using a liquid enzyme to convert the starch, and which leaves no sake flavor (as that comes from the action of the *koji*). Such “rice wine” has a neutral character, is very pale, and tastes like an ordinary white wine, but of course it isn’t that.

Plum Wine is made to a sake base, or to a rice wine base (see above), with plum extract added to flavor and sweeten the end product.

PROFILE:

ABV%	SMV/s.g.	Acidity	color
Yamato Plum Wine (Takara USA) 1991:			
12	-79/1.055	4.2/0.6	amber 3.0

Sparkling Sake so far as I know, no sake brewer has produced genuine sparkling sake, but the Honolulu Sake Brewery did make carbonated sake for a short time in the 1960's. The high U.S. Government tax on carbonated wine-type beverages condemned this effort to an early demise.

Mirin Sake this is very sweet, medium alcohol (8-12%) sake, used for cooking. Take care when buying mirin-sake. The cheap versions have salt added (check the label), as required by the U.S. government, for cooking wines which are not taxed. Pay the tax and get the real thing.

PROFILE:

ABV%	SMV/s.g.	Acidity	color
Kohnan Mirin Premium Cooking Sake 1991:			
12	-58/1.0405	1.3/0.19	amber 2

酒

CHAPTER THREE

THE COUNTRY SAKES OF JAPAN AND OTHER ASIAN JIUS

The most famous brewing district in Japan is the Nada area (181 breweries in 1983) in Hyogo prefecture, near the city of Kobe, a port city west of Osaka. The second most famous area is the Fushimi district (91 breweries) near Kyoto, followed by Akita prefecture (62 breweries) in Northwestern Honshu, and Hiroshima prefecture (116) in the Western end of Honshu. The first two areas produce about 20% of all Japanese sake, and contain most of the large breweries.

The number of Japanese sake breweries is steadily decreasing, as one might imagine. In 1926 there were 9587 sake breweries in Japan which declined in ten years to 7500 breweries. The war and reconstruction took its toll, so that there were only 4,073 in 1956, 3433 in 1971, and 2772 in 1982. Today, even fewer breweries remain. The breakdown in size is most interesting: in 1973, about 97% of the then 3,326 sake breweries were what we would call micro-breweries (producing less than 465,000-USgallons annually). In fact, no less than 71% of the total were even smaller brewers producing less than 80,000-USgallons annually. Brewers in this class make sake only on a seasonal (winter) basis, in much the same way their forefathers brewed a hundred years (or more) ago.

It was the new American interest in small breweries (micro-breweries) and wineries in the late 1970's and early 1980's that has lead to the introduction of

Japanese country sakes (*jizake*) to the American market; there are some 30 brands, from a number of small breweries, now available in the U.S. The major importer is the Numano Company of Los Angeles. Takesugu Numano has done for sake what Charles Finkel (Merchant du Vin, Seattle) did for Belgian beer; he brought the best efforts of the small Japanese sake brewers into the U.S. market. These are all high quality products, representing the cream of the Japanese sake industry.

Jizake often carries a "second class sake" label, lowest of the three government-recognized sake classes: Special Class, First Class and Second Class.

Special Class (*tokkyuu*), is the finest and taxed the highest. It is the most expensive and has the highest qualification standards. The samples submitted annually are analyzed and tasted by regional government teams, and certified as Special Class, or First Class.

First Class (*Ikkyuu*) sakes are taxed at about two-thirds the Special Class rate, and are good quality sakes.

Second Class (*Nikkyuu*) sakes are the most interesting because all that don't pass Special or First Class standards are automatically labeled Second Class sake. These are genuine second class sakes. Other Second Class sakes would be of two types: those intended to be Second Class sakes and those brewed by brewers not wishing to go through the hassle and expense of government testing. Among these are many fine country sakes (*jizakes*). According to Kondo (2) "it is not uncommon for...Second Class sakes to [win] gold medals at [sake judgings]." The small *jizake* brewers frequently cannot afford the lengthy time, effort, and money, necessary to obtain first class certification for their product, and they let the "second class" label remain. Aficionados know better than to worry about second class status of these fine sakes. Numano

says his country sakes are best served at room temperature, but I still like some of them served luke warm, at least in the wintertime.

In the U.S., the major problem with Japanese country sakes has nothing to do with quality, but rather with the fact that most are sold only in the large 1.8-liter bottles. The price is around \$20-40, so a person who wanted to sample a few and draw his own conclusions about which to buy is most certainly out of luck. This also has the effect of slowing sales, with the result that they may remain on the shelf for an over-long period.

Sometimes the bottling date is found on the label. If there is a bottling date on the label, it is sometimes noted in the Japanese style of dating things. Each emperor is given a reign title, and the years are numbered within that era, for example 1990 is year 65 on the old calender (Showa 65), and also 01 (Heisei 1) on the new Emperor's dynasty, 1991 is year 02, etc. Buy the youngest you can find, and try to get samples that have not been on the shelf too long, since light (especially fluorescent) is very bad for sake. Brown bottles are better than green, clear, or blue bottles. Boxed sake bottles are best. Remember, if the bottle does NOT have the alcohol warning on the label, then it was bottled BEFORE November 17, 1989—Avoid it.

As of April 1992, the Japanese government abolished first, second and special classifications.

酒

乾杯 Kampai!

新政 The New Era	Aramasa (Akita-ken)	真澄 Very Clear Sake	Masumi (Nagano-ken)	牡丹 Plum Brocade	Umenishiki (Ehime-ken)	DRY +5
美少年 Beautiful Boy	Bishonen (Kumamoto-ken)	鳥門頭 Straight of Naruto	Narutodal (Tokushima-ken)	春雷轉 Nightingale of Spring	Shunnoten (Yamanashi-Ken)	DRY +3
富久錦 Ever Lasting Fortune	Fukunishiki (Hyogo-ken)	大山 The Great Mountain	Oyama (Yamagata-ken)	七笑 Seven Smiles	Nanawarai (Nagano-ken)	MEDIUM DRY +1
春鹿 Spring Deer	Harushika (Nara-ken)	漢若狂 Devil Killer	Onigoroshi (Shizuoka-ken)	龍泉 Fountain of Akita	Hirazumi (Akita-ken)	MEDIUM DRY ±0
一人娘 Only Daughter	Hitori Musume (Ibaraki-ken)	男酒 Man's Sake	Otoko-Sake (Hyogo-ken)	萬代 Long Generation	Bandai (Fukuoka-ken)	VERY DRY +7
一ノ蔵 First Sake Plant	Ichinokura (Miyagi-ken)	男山 Mountain of Man	Otokoyama (Hokkaido)	男白瀧 White Fall of Niigata-ken	Koshino Shirataki (Niigata-ken)	DRY +4
賀茂名 Fountain of Hiroshima	Kamozumi (Hiroshima-ken)	澤井 Fountain of Tokyo	Sawanai (Tokyo)	峰乃白梅 White Mountain Plum Blossom	Minenohakubai (Niigata-ken)	DRY +5
なまはし Devil's Mask	Kariho (Akita-ken)	陣心 Drunk Heart	Suishin (Hiroshima-ken)	酒呑童子 Sake Devil	Shuten-Dhoji (Kyoto)	DRY +4
えおる Ornament of Celebration	Kusudama (Gifu-ken)	司牡丹 Pecny	Tsukasa Botan (Kochi-ken)	西の関 West Gate of Japan	Nishino Seki (Oita-ken)	MILD -2

Fig. 3.1 The Japanese Country Sakes from Numano

TASTE A THOUSAND YEARS OF JAPANESE TRADITION
JAPAN'S FINEST PREMIUM "COUNTRY" SAKE



OTHER ASIAN JIU TYPES

Nearly every Asian country has a variation or variations of jiu (rice beer), since all are rice economies. Many of these are made in the home, others are brewed commercially.

Korean variations. The Koreans make *Yak-joo*, medicine wine, which is unpasteurized, cloudy and acidic; *Tak-joo*, unfiltered and cloudy, and an especially insidious brew called *ma-kolee* (*maek-joo*), brewed at home and in small shops (recipe in Chapter Ten). It tastes a bit musty, and is consumed rather like rice soup, from a bowl, and it's cheap. The hang-over, I'm told, is ferocious. Incidentally, the Koreans also make credible sake.

China, today, produces about 100 different tonic wines and spirits throughout the country. Many of these are distilled products, such as the fiery Mao-tai, eight times fermented and distilled. This is true "white lightning," served at state banquets in the Great Hall of the People. There are other *jiu*-types brewed from millet, sorghum and sweet potatoes.

Professor Li Ch'iao-p'ing⁽⁷⁾ tells of Chinese brewing as described in the *Book of Rites* (*Li ji*). This book, dating from about the time of Christ, tells us the best time of ferment was the beginning of winter, the materials were rice and millet, yeast, mold culture, and water. The methods described included pasteurization, and were similar to those used later in sake production in Japan.

Another ancient Chinese text⁽⁷⁾, *Chi min yao shu*, dating from 500 AD, gives information on the production of "leaven" a mixed yeast-mold culture (available today as "Chinese Dried Yeast balls"). This was prepared in the seventh month of the lunar calendar, about August in our calendar.

Dogs and chickens were not admitted during the

time of its preparation...wheat was divided into three parts, [one each was steamed, roasted, and left raw]....After grinding and mixing, they were rubbed into a stiff paste and then kneaded by boys into cakes each four and a half inches broad by three inches thick. A room situated at the west having the door opening toward the east was required....The floor was swept and upon it were placed the cakes of leaven leaving a cross-way for the passage of the workmen. Four pieces of this cake...called "*chu-nu*", "servants of leaven," were put on the floor at the four corners of the room. [The door was then closed and sealed with mud, opened after one week] and closed again after the leaven-cakes had been turned over. [A week later they were heaped up and after three weeks taken out].

The leaven should be crumbled finely before use....

That process, it can be seen, allowed both mold and yeast to grow in the cakes.

The wines were made later in the year. *Geng-mi jiu*, a style similar to modern *jiu*, was made from a triple ferment using brown rice in a volumetric buildup. It required one *tou* (10-liters) of leaven, seven *tou* (70-liters) of water, and two *shih* (1-*shih* = 10 *tou* = 100 liters) plus four *tou*, a total of 220 liters of brown rice.

The leaven was soaked in water until froth was produced, (starter stage), the rice was washed, cooked (probably steamed, since actual cooking would have been quite difficult in those times) and allowed to cool. Then it was fermented with the liquor of the leaven until it was liquefied (first addition stage). There were two more additions of rice, using 8 *tou* each time (80 liters), and water. If the finished rice was bitter, two *tou* were added for a further ferment (fourth addition, to stabilize and build body, i.e. "sweeten" the finished brew). Fermentation was carried out in large jars similar to those used today for "thousand year old eggs." The brewers were careful to sanitize equip-

ment, and take great care at all stages of production.

The most famous of the ancient Chinese *jius* is still made, **Shao Xing Jiu** (soft sh: show—rhymes with cow—shing).

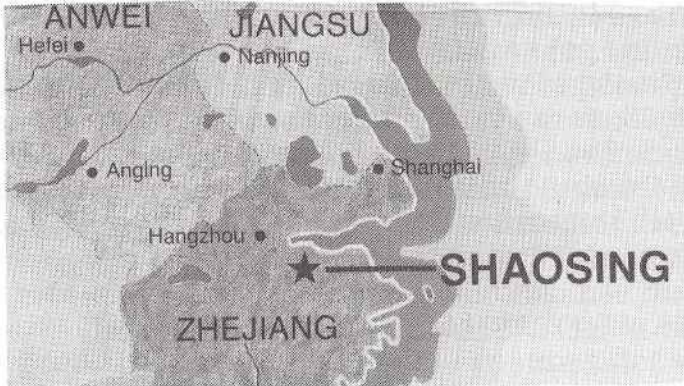


Fig. 3.2. Shao Xing.

Shao Xing is a Yangtze River delta town (pop. 100,000), south of Shanghai, on the south side of Hangzhou Bay in Zhejiang province. It is famous for the quality of its water, and rice, and naturally enough for the quality of its fine *jius*. Shao Xing is an industrial center, well known to tourists for its canals, roadside attractions and bridges. It is especially renowned for *Jianhu* (Mirror) Lake. In the old days there were three wine shops for every ten houses. As near as I can determine **Shao Xing** is an appellation, as it is often copied. **Shao Xing Jiu** was first made over 2300 years ago in the same area as it is made today. Today it is a "must" at Chinese weddings. Traditionally, wedding *jiu* was brewed a month after a daughter was born, then buried in the ground, to be dug up and served at her wedding or sent with her dowry. In those days the wines were sealed in beautiful jars carved with flowers or landscapes, hence the name **Hua Diao**

Jiu ("carved flower *jiu*"). Some export wines are still finished out in this grand manner.

By the fifth century AD, **Shao Xing Jiu** had become famous all over China, and by the Tang dynasty (618-907 AD) it had been codified in the *Jiu Jing, Book of Jius*. In more recent times **Shao Xing Jiu** was awarded gold medals at the Southeast Asian Fair in 1910 and the Panama International Exhibition in 1916. In 1985, at the Paris International Food and Tourist Association, Pagoda brand **Shao Xing Jiu** won the coveted Orange Osmanthus Leaf, and a Gold Medal from the 4th International Alcohol Beverages Rating Committee in Madrid, in that same year.

HOW SHAO XING JIU IS MADE

Shao Xing Jiu is a variety of *huang jiu* (amber *jiu*), a style very much appreciated in China, Taiwan, and Southeast Asia. Strictly speaking this is not "sake", yet it is made by a very similar process. The *huang jiu* is made using polished short grain glutinous (sweet) rice. The original process⁽⁷⁾ and the modern process^(7,9,11) is quite similar to that used to make sake in Japan. Originally, the rice was polished by being pounded with wooden mallets. Now there are machines to do that job.

The leaven or "wine medicine" must be ready. The production of the "wine medicine" (*Jiu niang*) in late fall is quite similar to making the leaven described earlier, but of course modern sanitary procedures prevail. The bacteria is often incorporated by adding *jiu niang* from a previous batch. Wheat and/or barley are sometimes used in modern *jiu niang* production. When the *jiu niang* is ready (several weeks of turning, and cutting), the damp mixture is cut into small pieces, and rolled into little balls, weighing about 10gm each. These "yeast" balls are called *jiu men*, and

were stored until actual jiu production starts. *Jiu niang* has yeast (*saccharomyces Shaoxing*) plus molds (*Aspergillus*, *Rhizopus*, *Monilia*, and others), plus *lactobacillus*.

Actual Shao Xing Jiu production begins in early winter by making a starter. Polished glutinous rice is washed and soaked in water for 36- 40-hours, and then steamed (1-hour) and cooled. Today regular short grain rice and lightly crushed wheat are also added. The rice is cooled by pouring cold water over it until it cools to about 85°F/30°C. The water is drained off and the rice transferred to wide-mouth fermenting jars. At this point the *jiu niang*/*jiu men* (yeast) balls are crushed and added to the cooled steamed rice to form "mother of jiu" (Japanese "*moto*"). The *jiu niang* is added (1 volume *jiu niang*:100 volumes rice or 1 ball:liter). The ratios of water, rice and *jiu niang* are volumetric. The mixture (about 160 liters of rice and 1.6 liters *jiu niang*) is packed into the jars and a hollow is formed in their center⁽⁸²⁾. In about 48-hours the rice grains gradually liquefy, lose their stickiness, and form a sweet-tasting liquor in the center.

The actual *jiu* production begins with adding 90 liters of water and 40 liters of crushed *jiu niang* to the sweet liquor. This is stirred (*kai-ba*: "opening with a paddle") three to six times a day for the next three or four days. Total ferment time for this, the primary ferment, is about two weeks. This process makes ordinary *jiu* (about 10-11% alcohol), but the Shao Xing Jiu is more like sake in strength and procedure. About 180 liters of polished glutinous rice is steeped (36-40 hours) and steamed (1-hour). This is then added to 150 liters of cold water in jars, after which 40 liters of crushed leaven (*jiu niang*) is added, and then the above "mother" is added to the ferment, which is carried on at 86°F/30°C, and then cooled later. The mixture is stirred at regular intervals, six times a day at first and once or twice later, for a total of one week. After 70-

80 days total, the ferment is finished. The raw *jiu* is pressed and settled again, and then pressed once more to separate the clear liquor, which is then heated to 120-140°F/50-60°C, and skimmed (to remove precipitated protein). The refined *jiu* is then brought to the beginnings of a boil, when it is instantly separated and cooled in special porcelain-earthenware jars, which are sealed with a mixture of porous clay and lotus leaves to allow the very slow entry of minute quantities of air. This oxidation process allows a delicate, smoky, sherry-like flavor to develop. The sealed containers are allowed to age for one to five years or longer.

Although this *jiu*-type tastes “dry” it is, in fact, semi-sweet. The Shao Xing styles include *Jia Fan* (semi dry) and *Hua Diao* (“carved flower *jiu*” bridal type—dry). These *jius* are found in the U.S., in most cities where there is a large Chinese population, such as Los Angeles, San Francisco, New York, Chicago, Portland and Seattle. At my favorite Chinese restaurant it is called wine, and it is



Fig. 3.3. Shao Xing jiu, including the “carved flower” jars.

served warm—sake-style, not hot—from a tallish blue-china decanter, and served in thin elegant cups which hold about 2-ounces. The Shao Xing is rich, dark and dry tasting, and the waiter may offer you some yellow Chinese rock sugar, or a Chinese dried sweet plum to sweeten your cup. These latter have dried plums, salt, sugar and licorice in their makeup. They give the Shao Xing a startling flavor jolt. However you take it, you will enjoy the smoky flavor. With me it's a near addiction. Serve it like sake: chilled, at room temperature, or warmed as described above. You can find **Pagoda Brand Shao Xing Rice Wine**, in small 180ml, and 750ml bottles or decanters, in Chinese and Vietnamese grocery stores. Shao Xing *jiu* is great with Szechuan, Thai, or Mexican food, or as an aperitif or digestif in the evening, wherever sherry is appropriate. It usually has about 18% alcohol, so treat it with respect. There are sweet styles, too, but they are cloyingly sweet. Two of the sweet styles are from Pagoda in Shao Xing: **Shao Xing Hsiang Hsueh Jiu**, strong and very sweet (20% sugar, 19% alcohol), and **Shao Xing Shaniang Jiu**, with medium alcohol (14%) and 7% sugar.

PROFILES:

<i>ABV%</i>	<i>SMV/s.g.</i>	<i>Acidity</i>	<i>color</i>
Pagoda brand Chia Fan Rice Wine (Chn-Zhejiang) 1991:			
18	-7.4/1.0051	2.1/0.3	dark amber
Pagoda brand Shao Xing Rice Wine (Chn-Zhejiang) 1991:			
18	-12.4/1.0086	2.8/0.4	med dark amber
Pagoda brand Supreme Shao Hsing Hua Tiao Chiew (Chn-Zhejiang) 1991			
18	-3.9/1.0027	1.06/0.15	med dark amber
Shaoshing Rice Wine (Taiwan) 1987:			
14.5	+7.6/0.9947	0.7/0.1	pale amber

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CHAPTER FOUR

FOOD FOR SAKE

Everyone knows that sake goes well with Japanese food, but did you ever wonder why? It may have something to do with the fact that Japanese cuisine revolves around rice, but I don't think that's it. I believe it has more to do with the fact that sake does well with any food. It goes well with Chinese and other Asian cuisine, but also with Mexican or Italian, French or German. It is a delicious accompaniment to such "American" dishes as chile beans (jalapeño hot, and sake chilled), and pizza (chill the sake). Beef stroganov? Chill the sake. Then there's the great American standby roast turkey with all the "trimmings." Well, I'm here to inform you that chilled or room temperature sake is just perfect with Thanksgiving dinner. Peanut butter sandwiches? Great with chilled sake. One of my favorite snacks with sake is a mini pretzel, topped with a slice of apple, and that surmounted by a slice of Canadian Black Diamond Cheddar Cheese. We use pretzels and apple slices, as snacks, at our sake tastings. Speaking of snacks, nuts and pistachios, crackers and cheese all make good snacks with sake. Cheese and fruit go very well with sake, and heavy cheeses, such as Stilton, blue cheese and Roquefort go just fine with a heavy genshu sake. On the other hand, a delicate ginjo needs something a little less assertive. Chocolate? Did I mention there's a sake brewery in California selling sake-filled chocolates?

COOKING WITH SAKE

Whenever you encounter a recipe calling for

white wine, it is quite likely that sake will also work, and may even improve the recipe, try it. There are many Japanese recipes calling for sake, and even where they don't call for sake, add some anyway. Then there's mirin sake, which is very sweet, and which is demanded in such recipes as teriyaki beef, pork or chicken. This is how the Japanese sweeten their dishes in many cases—they use mirin sake instead of sugar. Be aware that some mirins have salt. That's to keep you from nipping on the bottle between bouts with the stove. Check the label, because the regular mirin costs more than the cooking mirin, but regular mirin is made for cooking, and the cooking mirin has salt.

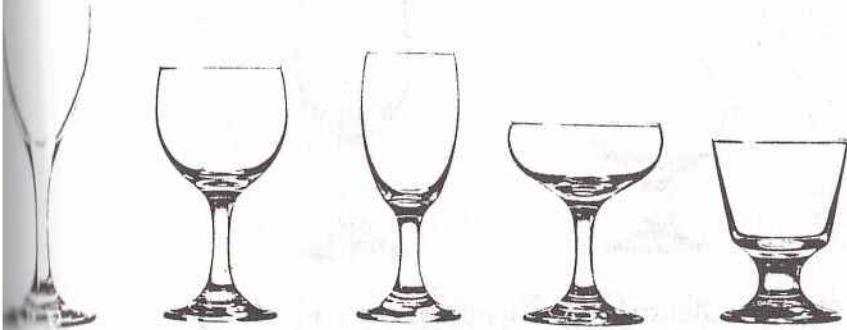
The Chinese *jiu* closely resemble sherry, and may be used as a substitute for that in every case, but of course if the recipe is Chinese, then Chinese *jiu* is really called for, and not western style sherry.

GLASSWARE FOR SAKE

The Japanese service with porcelain *tokkuri* or wooden *masu* are a little out of place in western dining, but sake can be served in small brandy-snifters for the heavy *genshu* or delicate *ginjo*. The rest of the sake types are just great when served in standard wine glasses. If you are serving several *jiu*s, try to use a different glass for each. Serve chilled or at room temperature, depending on your own feelings about the situation. Sake may also be served warm (not HOT) in glassware, or in Japanese style *tokkuri*, as an after dinner digestif, if that seems appropriate at the time. Try to remember there are no rules in this area. We can make them up as we go.

**CHART OF GLASSWARE FOR DRINKING SAKE IN
WESTERN SETTINGS**

(from the Libby catalog, but any glassware in these
styles will do)



top row: tall flute #3796, wine #3769, whiskey sour
#3775, champagne #3777, footed rocks #3746



bottom row: juice #556HT, side water #149, juice
1455HT, juice #1833HT, rocks #1966CD

Fig. 4.1 Glassware for serving sake and other jius, two
distinct styles here, stemware and regular glassware.
The serving size is 3.5-5.5 ounces/100-160ml.



Fig. 4.2. Glassware for judging sake and other jius. Left is the small brandy snifter, and right the standard wine judges glass.

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BOOK TWO
SAKE IN AMERICA

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CHAPTER FIVE

SAKE CONSUMPTION IN THE U.S

The Japanese may be drinking less sake, but U.S. sake consumption has almost doubled since 1985. By 1985 U.S. sake breweries were selling more sake in this country than all of the Japanese imports combined. In 1990 Americans drank about two million gallons of sake, most of it in Los Angeles and San Francisco (60%), but Texas and Florida consumption is also up. About 55% of the sake consumed in the U.S. that year (1,100,000-gallons) was made in this country, with the balance imported from Japan. U.S. sake drinkers are fond of sake margaritas, sake with orange juice and grenadine ("Rising Sun"), and sake 'n' cider (hot) on ski slopes.

Sake consumption is also up in other countries as well, indeed it has almost tripled since 1971. Canadians drink 112,000-gallons of Japanese sake, while West Germany and Great Britain consume 58,000- and 43,000-gallons respectively. Taiwan remains the largest customer outside the U.S. with 156,000-gallons being sent from Japan to that country, and U.S. sake brewers are beginning to explore that market, too.

BROWN RICE SAKE

Brown rice sake is called *Genmai*- (brown rice) *Shu* (sake) has achieved an almost cult status in the U.S. among natural food aficionados, whose affinity is towards the macrobiotic diet and its dependence on

brown rice. Genmai-shu is a recent innovation, because as noted earlier, sake is ordinarily made only from highly polished rice.

The Kameman Brewing Co., of Tsunagi, in Kumamoto prefecture, southern Japan, was approached, a few years back, by an Australian natural food jobbing group, with a request to make a brown rice sake. The brewery, after a few experiments, agreed to manufacture such a product, "Nutritional Genmai Brown Rice Sake," which, for a time, was available in Florida from the Oak Feed Natural Foods. I have no other information about it. Brown rice sake is said to be smoother and more complex, less acidic, and more alkalizing in its effect. This is more of a traditional farm-house sake, darker in color and with more residual dextrin (complex starches) content.

Brown rice sake brewing forms one of the strangest chapters in American sake brewing history. There was an American brown rice sake brewery, the Kimoto brewery in Berthoud, Colorado (near Denver), which was the inspiration of Caucasian brewmaster Mel Merz. Merz had been fascinated for some time with the idea of making brown rice sake, and in 1983-84 he finally put together a small sake microbrewery. The Kimoto brewery (name means "original brewing method") made about 3000-gallons annually between 1984 and 1987, before going out of production early in 1988.

The product was well made and showed a good deal more complexity than most commercial sakes, not as smooth in some ways, but with more flavor nuances. The color was a bit more amber than the yellow of my home-made sake. The brewery was unable to sustain sales at a level to ensure success, and Merz was never able to fully exploit his natural foods market. Moreover, the Japanese community and Japanese restaurants were not open to serving brown rice sake.

Merz had no way of achieving national distribution, and his operation finally folded, but not until after he had switched to making amazake, a sweet drink made from rice and *koji*. Incidentally, nearby Boulder Colorado is said to have the highest per-capita sake consumption in the U.S., mostly by the Tibetan community there.

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CHAPTER SIX

SAKE BREWING IN THE USA

The first U.S. sake brewery was the Japan Brewing Company of Berkeley in 1902, and by the time prohibition became effective in 1919 there were nine American sake breweries, with others in Emeryville, Watsonville, San Jose, (all in California) and Honolulu and Hilo in Hawaii. After prohibition was repealed in 1934, sake breweries were built in Loomis (CA), Los Angeles, Oakland, San Francisco, San Jose, Watsonville, Seattle, and another five in Hawaii, but in 1942, the U.S. government ordered all sake production stopped as a war measure (to conserve rice).

In 1948 production was resumed in three Hawaiian breweries, and two were established in Colorado, where a number of Japanese Americans had settled after the war. All except the Honolulu Sake Brewery failed. The Honolulu Sake Brewery not only survived prohibition (as an ice manufacturing plant), and the war (as a soy sauce manufacturing plant)—the U.S. Army occupied the sake chill rooms and the ice-making facilities for military use), but has remained in production continually since 1948. It was purchased by the Takara Shuzo (Sake) Company, Ltd, of Kyoto, Japan in 1986.

THE HONOLULU SAKE BREWERY

The Honolulu Sake Brewery was established in 1908 by Tajiro Sumida and Tomokuni Iwanaga as the Honolulu Japanese Sake Brewery Co., Ltd. It was one

of the first sake breweries ever built outside of Japan, (five others had been built in California between 1902 and 1907) the first in Hawaii, and may have been the first to use refrigeration in sake production, making it also the first sake brewery to produce sake on a year round basis, anywhere in the world. The old buildings are gone, but newer buildings dating from 1934 are still there on Booth Road in the Pauoa district of what is now Honolulu.

Sumida and Iwanaga perceived a market and a need for quality sake. Early Japanese immigrants, who came to Hawaii as plantation laborers, were very poorly paid and there was little extra cash for luxury items such as expensive imported Japanese sake. Sumida and his partner set about changing that by building the world's first tropical sake plant. Sake must be fermented cold at temperatures ranging between 43 and 60 degrees F (6-15°C), and refrigeration (invented some 35 years earlier) made the whole thing possible. Until that time sake was brewed only in winter months (October through February) in Japan. Those early days were fraught with problems, mostly because refrigeration was not all that dependable. They brewed and sold "hundreds of thousands of gallons of Takarajima (Treasure Island) Sake" between 1908 and April 1918 when Prohibition became law in Hawaii.

The brewery switched to freezing water at that point, by turning up the refrigeration machinery. They became the Honolulu Ice Company, keeping the faith for the next 16 years.

In 1934, the company went public with \$250,000 capital and 400 shareholders. They built a new plant, and plunged back into the sake brewing business after installing new machinery. They brewed **Takara Masamune Sake**. The name means treasure swordsman, in a play on Japanese words. Takara Masamune

still remains the brewery's flagship brand today. Seven years later, more bad luck: in 1941 Japan attacked Hawaii, the largest American outpost in the Pacific. Shipping difficulties put rice in short supply, and the government put a ban on sake production for the duration. They hadn't been all that enthusiastic about an alcoholic beverage which was only sold to local Japanese-Americans in any case. The U.S. Army Corps of Engineers took over the sake chill rooms and the ice making facilities for military use.

The war changed for all time the structure of Japanese-American family life all over the country. The versatile owners never missed a step, changing production to soy sauce, and hunkering down to sit the war out, and after the war they resumed ice production, but sake brewing had to wait a little longer, for a government OK.

By 1948, a long three years after the war, the company was able to resume sake production, along with two other Hawaiian Sake breweries. In 1950 they added vinegar brewing to their repertoire, and in 1954,



Fig. 6.1 Honolulu Sake Brewery in 1975



Fig. 6.2
Shinzaburo
Sumida and
his son Ron
Sumida, son
and grandson
of the founder.



Fig. 6.3. One of
the three rice
polishing
machines.

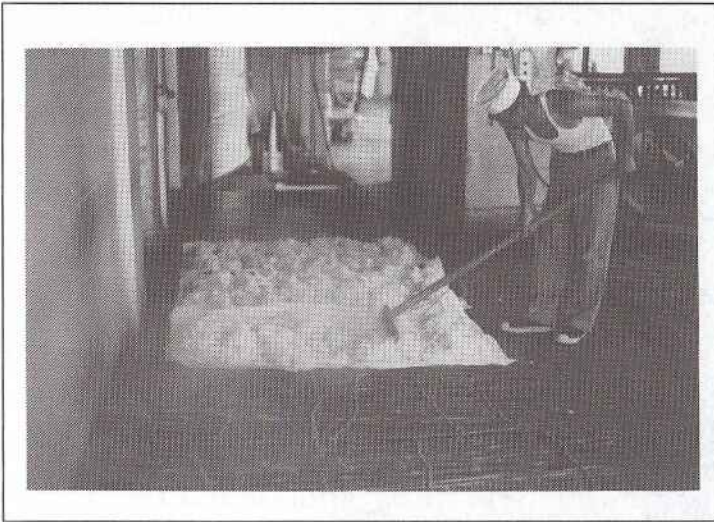


Fig. 6.4. Breaking up the rice clumps after steaming.

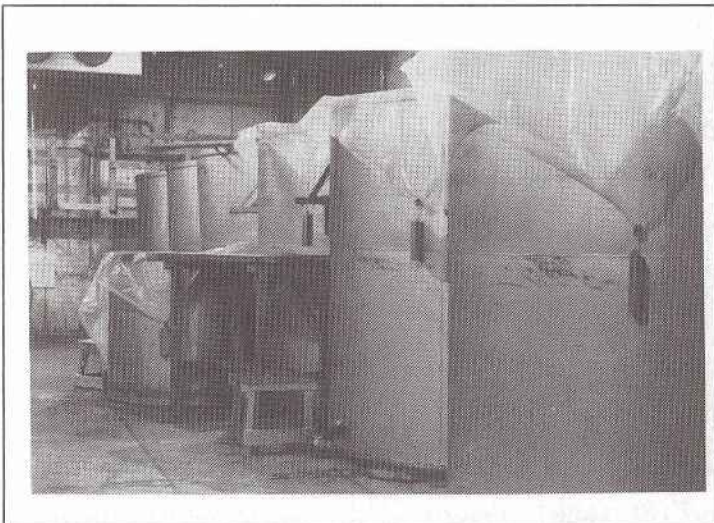


Fig. 6.5. Primary Fermenters Moromi stage.

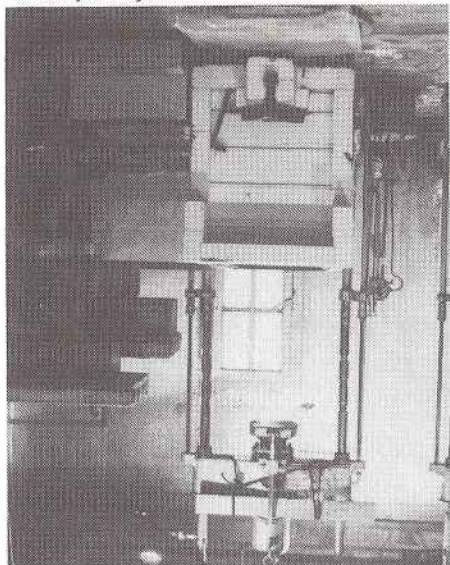


Fig. 6.6. Sakabune—sake press.

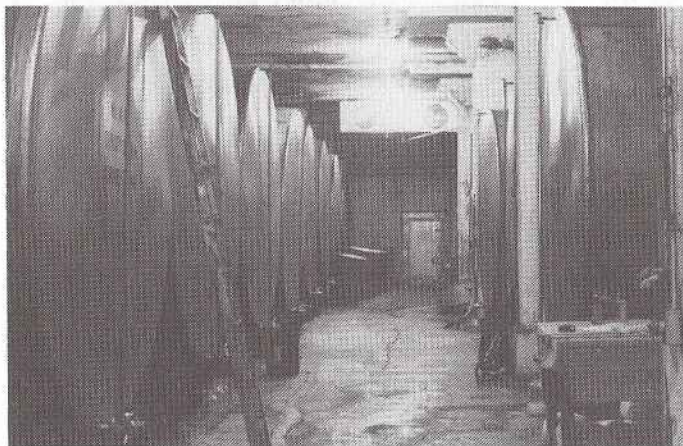


Fig. 6.7. Storage tanks.

Sumida and his son Shinzaburo hired a young Japanese brewmaster, Takeo Nihei. Nihei proved to be a first class technical innovator, his major contribution was the perfection of brewing technology with a new low-foaming yeast strain. Japanese breweries of that era were taking many shortcuts in the brewing system, to the detriment of the finished product. Nihei kept the old country's traditions alive in America, but he was also willing to try new ideas. Among other things, he even tried brewing a carbonated sake called **Polo Champion**, which was marketed in Hawaii from 1958 to 1964, but high federal taxes on carbonated "wines" doomed it to failure.

The last of the competition, the Fuji Sake Brewery at 539 Cook St Honolulu, ceased operating in 1965, and the Honolulu Sake Brewery was left alone as America's only sake brewery until Take Numano built what is now the Takara Sake USA plant in Berkeley, in 1976. Sake in America has had a long and dignified history, but nowhere is it more outstanding than in Hawaii.

CALIFORNIA SAKE BREWERIES

There are now five sake breweries in California. The oldest, Takara Sake USA (a Japanese-held American firm) in Berkeley, was originally built by Taketsugu Numano, a sake importer, in 1976, and purchased by Takara in 1982. Numano could be called the "Father" of modern sake in America. The Takara plant in Berkeley produces the Japanese Sho Chiku Bai sake.

Then, there's Ozeki San Benito, a Japanese-American firm which built a brewery (1979-80) down in Hollister (near Santa Cruz). A third sake company, the American Pacific Rim, Inc., in Los Angeles, was completed by Numano in 1987, and brews the Ki-Ippon brands. The Kohnan Sake brewery (Japanese

owned) opened in Napa in March 1990, and is already planning to quadruple production. Finally, the Japanese-owned Gekkeikan Sake Brewery, (Kyoto), just completed a plant in Folsom, near Sacramento, and began production in November 1990.

For the immediate future, Hakushika, another Japanese brewery is building a plant near Golden, Colorado, to take advantage of that famous Rocky Mountain water, (opening July 1992) and here in Oregon the Japanese Momokawa Brewery (northern Honshu) plans to open a plant in Forest Grove, about 30 miles west of Portland. They plan to be operational in 1993, and they hope to grow their own rice, in Oregon, too.

Total capacity of the eight American sake breweries will be over four million gallons total, but production is nowhere near that level yet.

The success of the new American-Japanese sake breweries can be traced to several factors. Most important is the fact that, due to the high price of rice in Japan, it is no longer economical to produce sake in that country. In fact, some American sake has already been exported to Japan, with more to follow.

HISTORICAL LIST OF U.S. SAKE BREWRIES 1902-1991

PRE-PROHIBITION SAKE BREWERIES 1902-1918

(a + sign means that the brewery was revived in 1934 after prohibition was repealed)

California

BERKELEY

1. Japan Brewing Co. 1902-06

EMERYVILLE

2. Japan Brewing Co. 1907

SAN FRANCISCO

3. Japan Brewing Co., 207 Battery St ca1904

SAN JOSE

- 4a. Sugita Bros., 569 E Taylor 1905-6
 - b. J.Sugita 1906-08
 - c. K.Iida Rice Beer Brewing Co. 1908-9
 - d. Iwaguchi & Co Rice Beer Brewery 1909-ca1915
- 5. K.Hayashi Sake Brewery 1915-16

WATSONVILLE

- 6. Tamasaki & Murata Sake Bry. 1907
Hawaii

HILO

- 7a. Hilo Sake Brewery (Piopio) 1913-1918+

HONOLULU

- 8a. Honolulu Japanese Sake Bry. Co,Ltd 1908-18+
Sumida & Iwanaga, brand: Takarajima
- 9. Hawaii Seishu Kwaisha,Ltd 1913-18

POST-PROHIBITION SAKE BREWERIES 1934-1942

(a + sign means that the brewery was revived in 1947 or 1948
after wartime sake prohibition was rescinded)

California

LOOMIS

- 10. K.Igarashi Brewery 1934

LOS ANGELES

- 11a. American Sake Brewery Co 1934-5
 - b. Asahi Wine Mfg 1935
- 12. U. Teshima, 2222 Barry Av 1934-5

OAKLAND

- 13. San Jose Sake Brewery, 1501 E 15th St .. 1934-5

SAN FRANCISCO

- 15a. California Sake Brewery Co, 432 Clay St 1934-5
 - b. Nippon Sake Brewing Co 1935-37
- 16a. Aiji Matsuo, 480 Bryant St 1934-7
 - b. Matsuo Sake Brewing Co 1937-41
- 17a. Katsuo Shioji, 342-5th St 1934
 - b. San Francisco Sake 1934-5

SAN JOSE

- 18a. San Jose Sake Brewery, 291 Jackson St .. 1934-5

Sake (USA)

- b. Nippon Sake Bry., Inc 1935-40
WATSONVILLE
19a. Ikuta Hashimoto, 110 Union St 1936-8
b. Hiroshi Hashimoto 1938-40
Hawaii
HILO
7b. Hilo Brewery Ltd (1913) 1937-42
brand: Togo Masamune; Hilo Masamune
20a. Nichibei Shuzo Kabushiki Kaishu Ltd .. 1935-42+
(American Japanese Sake Brewery)
165 Kamehameha Av brand: Kokusui, Zuiko
HONOLULU
8b. Honolulu Sake Bry. & Ice Co (1908) 1934-42+
2106 Booth Rd, 8,000 bbl cap
21a. Kanda Shokai Ltd, 539 Cook St 1934-5
b. Fuji Sake Brewery Ltd 3,000 bbl cap 1935-42+
KULA, MAUI
22. Maui Sake Brewery Ltd 1935-42
brand Hinode & Aloha Masamune
Washington
SEATTLE
23a. Tsuji, Sakai 719 Dearborn St 1935-6
b. Asahi Wine Mfg Co 1936-40

POST-WAR JIU BREWERIES 1947+
16 total 7 currently operating or about to open.
California
BERKELEY
24a. Numano Sake Ltd, 708 Addison St 1977-82
b. Takara Sake USA 1982+
FOLSOM
25. Gekkeikan 1991
GARDENA
26. Koryu Winery (Korean style Taekjoo) ... 1981-83
HOLISTER
27. Ozeki San Benito 1979+

LOS ANGELES

- 28. Central Sake Brewing Co. 1948-50
- 29. California Sake Brewing Co. 1947-9
- 30. Los Angeles Sake Brg. Co. 716 E 5th St . 1947-9
- 31. American Pacific Rim 1987+

NAPA

- 32. Kohnan Inc., brand Hakusan 1990+
Colorado

BERTHOUD

- 33. Kimoto Brewing co 1984-88
brand Kimoto Genmai

DENVER

- 34. Denver Brewing Co., 1611 Platte St. 1947-50
brand "Star" Masamune
- 35. Colorado Sake Brg. Co., 2845 Walnut St. 1947-9
brands Geppo; Hakumine; Kotobuki

GOLDEN

- 36. Hakushika 1991+
Hawaii

HILO

- 20b. Nichibei Shuzo Kabushiki Kaisha Ltd (1935) 1955-7
c. Kokusui Co Ltd, Sake Brewery 1957
cap 10,000 bbl

HONOLULU

- 8c. Honolulu Sake Bry. and Ice Co (1908) ... 1948-87
brands: Takara Masamune; Takara Masume
- d. Takara USA Honolulu Sake Brewery 1987+
cap 8,000 bbl
- 21c. Fuji Sake Bry. Ltd, 539 Cook St (1934) ... 1948-65
George S Fujii, brands Rahuen, Kinpyo Masamune
3000bbl cap

Oregon

FOREST GROVE

- 37. Momokawa Sake Brewery 1993

References: Modern Brewery Age Blue Book (annuals)

Register of United States Breweries 1876 to 1976, Friedrich & Bull

CHAPTER SEVEN

DIRECTORY OF OPERATING AMERICAN SAKE BREWERIES

The identifying number of each brewery conforms to those on the master list of American Sake Breweries in the previous chapter. They are listed alphabetically, first by states, then by cities and individual companies. There are no large American sake breweries (production over 3-million US-gallons—11,799Kl), all are either small regional breweries (annual production over 15,000 US barrels—465,000-gallons—1760Kl), or micro-breweries brewing less than that amount. At this time there are no sake pub-breweries in either America or Japan (pubs or restaurants producing their own sake on their premises).

酒

Sake (USA)

CALIFORNIA

Berkeley

24b. Takara Sake USA 1982

BREWERY NAME: TAKARA SAKE USA, Inc.

Type: small regional.

TELEPHONE: 510/540-8250.

ESTABLISHED: 1982, began operations 1983.

PRESIDENT: Kiyoshi Ishikawa.

TOJI (Brewmaster): Seizaburo Kawano.

ADDRESS: 708 Addison St, Berkeley CA 94710.

PRODUCTION FIRST YEAR (1983): 230,000 USgallons.



PRODUCTION 1990: 640,000 gals.

Brewsize: 6000 gallons. Capacity 640,000 gallons.

BRANDS:

<i>ABV%</i>	<i>SMV/s.g.</i>	<i>Acidity</i>	<i>color</i>
Sho Chiku Bai Sake 1991:			
16	+2/0.9986	1.06/0.15	0.4
Sho Chiku Bai Nama Sake 1991:			
15	+5.6/0.9964	0.7/0.10	0.25
Sho Chiku Bai Go Kai Sake Dry 1991:			
16	+4.8/0.9967	0.9/0.13	0.4
Sho Chiku Bai Nigori Sake 1991:			
16	-20/1.013	1.06/0.15	milky white

The brewery also makes **Sho Chiku Bai Light**, **Benihana** (private label brew for that restaurant chain), **Takara Mirin** and **Senryo Mirin** (salt-free cooking sakes), and several Plum wines.

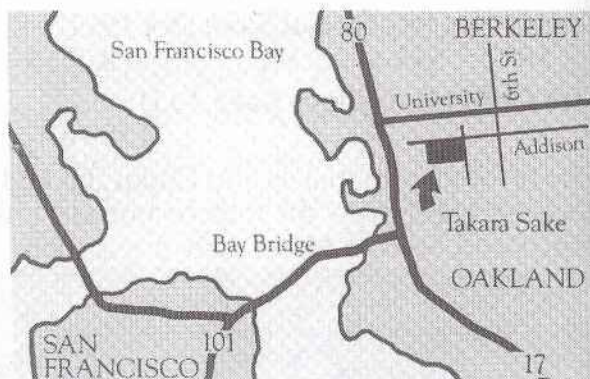


BEST SELLER: Sho Chiku Bai Sake, name means “pine-bamboo-plum,” which are symbols of “Happiness” in

Sake (USA)

the Japanese culture, brewery recommends serving warm at 110°F/43°C or at room temperature. Sold in 18liter cartons, 1.5liter, 750ml, 375ml, and 180ml bottles.

TASTING ROOM: open Monday through Sunday 12 noon to 6pm. Visitors can buy the brewery's products in the tasting room. David Belknap is Tasting Room Manager.



TOURS: There are no tours, but there is a slide presentation about sake production shown on request.

DIRECTIONS: take University exit I-80 go down University, turn right at 6th, and take the next right to Addison.

BREWERY MARKET AREA: Nationwide distribution, Puerto Rico, Canada and Mexico.

COMPANY INFORMATION: This is owned by the Japanese Takara Shuzo Co Ltd., the largest Japanese alcohol beverage manufacturer.

EMPLOYEES: 35

BREWERY SAYS: Berkeley was selected as the site for Takara Sake USA because: its cool climate allows year-round sake production, its close proximity to the Sierra Nevada's pure water supply and to the Sacramento Valley's quality rice fields.

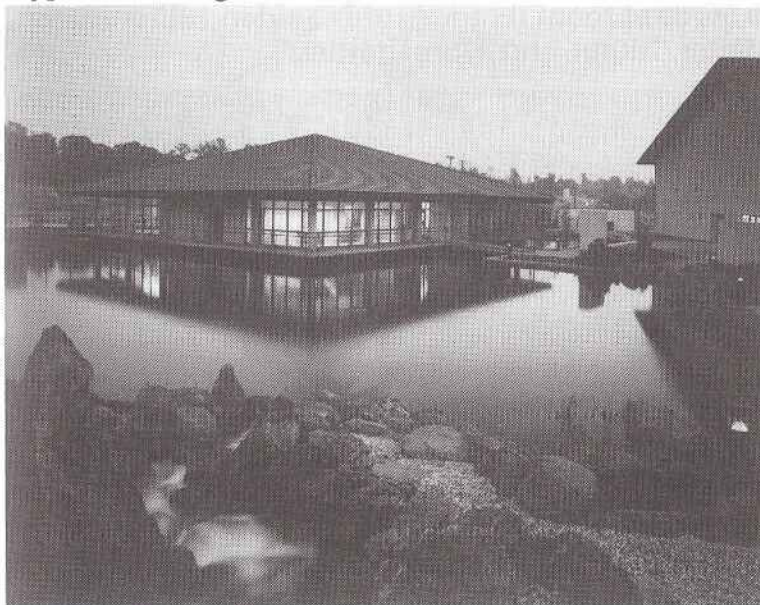
酒

Folsom

25. Gekkeikan 1991

BREWERY NAME: GEKKEIKAN SAKE (USA).

Type: small regional



TELEPHONE 916/985-3111

ESTABLISHED 1989: began sales June 1991.

PRESIDENT: Shoichi Toda.

TOJI (brewmaster): Masa Hatsuyama.

MANAGER, GENERAL AFFAIRS: Lydia Jane Failing.

ADDRESS: 1136 Sibley St., Folsom CA 95630.

PRODUCTION: 1991: 240,000.

Brewsize may be 6000 gallons. Capacity about 480,000 gallons.

BRANDS:

<i>ABV%</i>	<i>SMV/s.g.</i>	<i>Acidity</i>	<i>color</i>
Gekkeikan Original Sake 1991:			
16	+2/0.9986	1.5/0.21	0.1

Sake (USA)

Gekkeikan Draft Sake 1991:

15 +3.5/0.9976 1.5/0.21 0.1

BEST SELLER: Gekkeikan Original Sake, name means "Laurel Crown," recommend serving warm at 105F/40.5C or at room temperature. Sold in 18liter carton, 1.5liter, 750ml, and 375ml bottles.



TASTING ROOM: Daily 10-5

TOURS: Self guided, except large groups. Call Faith Henry for appointment.

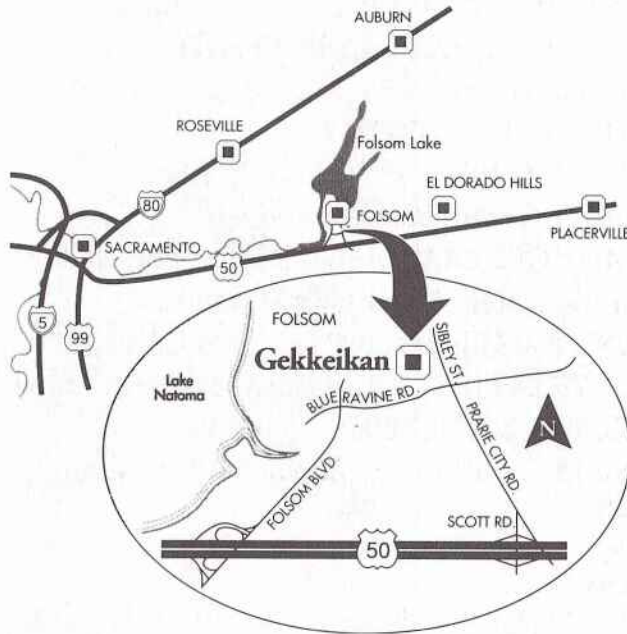
DIRECTIONS: 15 miles east of Sacramento.

BREWERY MARKET AREA: Nationwide distribution

Company Information: This is owned by the Japanese Gekkeikan Sake Brewery of Kyoto, the largest sake brewer in the world.

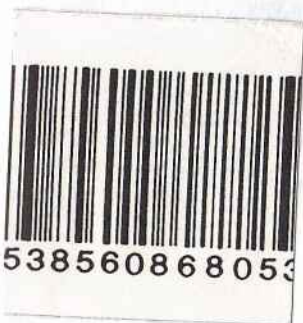
EMPLOYEES: 25

BREWERY SAYS: Gekkeikan Sake: from Fushimi to Folsom. Gekkeikan's state-of-the-art sake brewery and



tasting room in Folsom, California is the latest chapter in a continuing success story that began more than 350 years ago in Fushimi, Japan, as part of its strategy to reach new markets. It is the company's first brewing facility in North America and brings to six the number of breweries bearing the Gekkeikan name. Why Folsom? The right water, an abundance of quality rice, and an excellent community-the perfect setting for a skilled brewmaster backed by three and one-half centuries of experience.

酒



Sake (USA)

Hollister

27. Ozeki San Benito 1979

BREWERY NAME: **OZEKI SAN BENITO**

Type: microbrewery

TELEPHONE: 408/637-9217

ESTABLISHED 1979, first sales July 1980.

PRESIDENT: Toshiyuki Chinen.

ASSISTANT GENERAL MANAGER: Robert Ballard

TOJI (brewmaster): Michitsugu Ozawa.

ADDRESS: 249 Hillcrest Rd, Hollister CA 95023

PRODUCTION FIRST FULL YEAR (1981): not revealed

PRODUCTION 1990: 300,000 gallons.

Brewsize 1300-gallons. Capacity 300,000 gallons.

BRANDS:

<i>ABV%</i>	<i>SMV/s.g.</i>	<i>Acidity</i>	<i>color</i>
Ozeki Dry 1991:			
14.5%	+3/0.998	1.5/0.21	0.2
Ozeki Ginjo Premier Sake 1991:			
16	+1/0.999	1.3/0.18	0.15
Ozeki Sake 1991:			
16	+1/0.999	1.8/0.25	0.2

Brewery also makes **Kikkoman Mirin** (cooking) Sake.

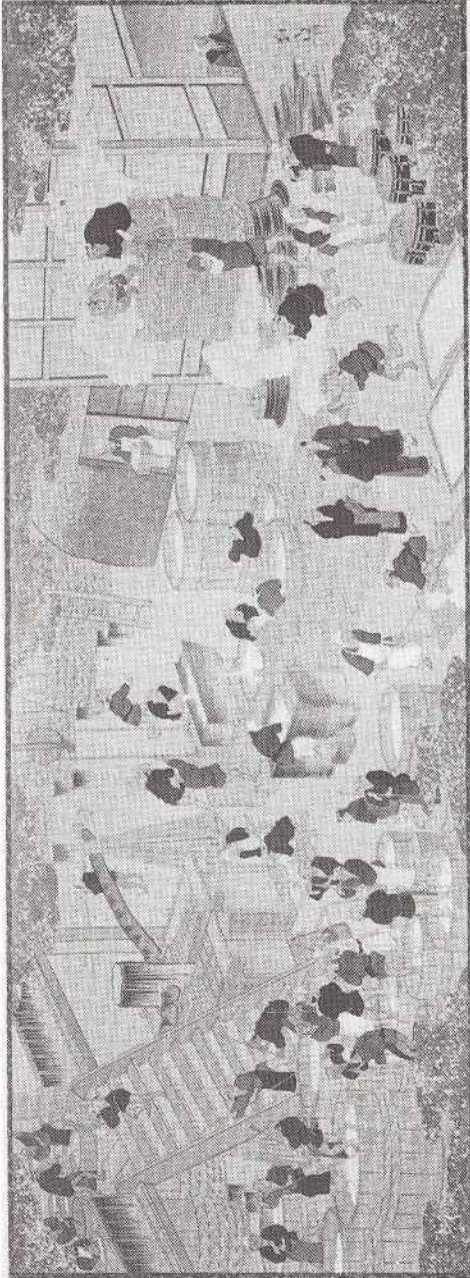
BEST SELLER: **Ozeki Sake**, name means "No.1" as in "Sumo Champion," recommend serving warm at 105-110°F/41-43°C.

TASTING ROOM: open by appointment only, sales by appointment only.

TOURS: for groups, by appointment only.

DIRECTIONS: From Highway 25 at Hollister, turn East at 1st light, follow Santa Ana Rd to end, go left to Hillcrest and down Hillcrest about ¼ mile on the right.

BREWERY MARKET AREA: National distribution



OZEKI SAKE BREW-HOUSE IN THE 18TH CENTURY

OZEKI SAKE BREWING CO., LTD. is one of the largest and oldest sake brewing companies in Japan. Its history dates back to 1711 when Osakaya Chobei, the company's predecessor, first introduced his sake on the market.

Ozeki's original brewery in Nishinomiya—mid 1700's

COMPANY INFORMATION: they are owned by three companies: Ozeki Corp., Japan, Kikkoman Corp., Japan, and JFC International, Inc.

EMPLOYEES: 17



BREWERY SAYS: brewery officials declined comment on their product line.

SALES OFFICE: 840 Hinckley Rd, Burlingame CA 94010; tel 415/692-7989, or JFC International, 540 Forbes Bv, South San Francisco CA 94080; tel 415/871-1660.

酒

Los Angeles

31. American Pacific Rim 1987

BREWERY NAME: AMERICAN PACIFIC RIM

Type: microbrewery

TELEPHONE: 213/583-1814



President Take Numano



Brewmaster Jun Tanaka

Take Numano should be called the father of California sake, because he has successfully operated two sake breweries in California during the time since 1977, and has been instrumental in the success of American sake brewers. Numano is the only sake entrepreneur to successfully export American sake to Japan. The others (I've been told) are reluctant to export their sake to Japan for fear of a Japanese consumer backlash against their Japanese-produced products. American sake is much less expensive to produce than Japanese sake, because of the high price of Japanese rice.

ESTABLISHED: 1987, began operations June 1988, first sale Dec. 1, 1988.

Sake (USA)

PRESIDENT: Taketsugu Numano

TOJI (brewmaster) and Plant Manager: Jun Tanaka

ADDRESS: 4510 S Boyle Av, Los Angeles CA 90058

PRODUCTION FIRST FULL YEAR (1990): 74,000 gallons.

PRODUCTION 1991: 97,000 gallons.

Brewsize 1375-gallons. **Capacity** 250,000-gallons.

The brewery also makes **Golden Buddha Mirin** cooking sake, and **Taiho** bulk sake for restaurant sales (usually through a "machine").

BRANDS:

<i>ABV%</i>	<i>SMV/s.g.</i>	<i>Acidity</i>	<i>color</i>
California Ki-Ippon Nigori 1991:			
18.5	+5/0.9965	1.7/0.24	milky white
California Ki-Ippon Premium Dry 1991:			
18.5	+5/0.9965	1.7/0.24	0.4
California Ki-Ippon Sake Dry 1991:			
15.5	+3/0.9998	1.7/0.24	0.1

BEST SELLER: California Ki-Ippon Premium Dry, name means "pure rice sake from only one company/area," recommended serving temperature: 33°F/0.5°C, (keep sake in freezer before serving). This product is not heat pasteurized, so it must be kept refrigerated. Sold in 18liter carton; 1.5liter; 750ml and 375ml bottles.

TASTING ROOM: none

TOURS: by appointment only

DIRECTIONS: In the Industrial Area, city of Vernon.

BREWERY MARKET AREA: Western US; some Midwest, plus NY, NJ, Boston, FL, and TX.

COMPANY INFORMATION: Owned by Numano Shoji, Numano started what is now Takara Sake USA, in Berkeley 1976, and sold it to them in 1982. This is his second sake brewery. He also imports a line of Japanese Country Sakes.



EMPLOYEES: 11

BREWER SAYS: As the producer of California Ki-Ippon Sake, I invite everyone to try and sample the pure and fresh taste of my naturally brewed sake, which allows you, the artful connoisseur, to fully appreciate the smooth sensation of California Ki-Ippon Sake, whether hot or cold.

酒

SAKE PRODUCTION AT AMERICAN PACIFIC RIM SAKE BREWERY

Sake production begins when a shipment of 2.5 tons of already polished (to 75%) rice arrives at the brewery from the rice broker. One fifth of that amount is set aside to make *koji*. The rice is first soaked, then steamed (fig.

7.1)], and then processed through the rice separator (fig. 7.2), where the clumps are broken up by metal "fingers." The rice is then cooled, and inoculated with the mold *Aspergillus*

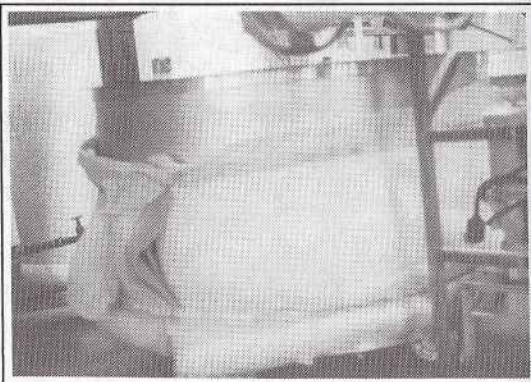


fig. 7.1

Oryzae. *Koji* production takes 48-hours, and dark colored mold spots begin to appear after 24-hours (fig. 7.3), and after another 24-hours the *koji* is ready (fig. 7.4) for *moto* production (fig. 7.5). When the *moto* is ready, full pre-

paration of the *Moromi* ferment may begin (more soaking, steaming, and separating the rice clumps). Fig. 7.6 shows the floor above the main fermenting room. The lids on the floor open to in-

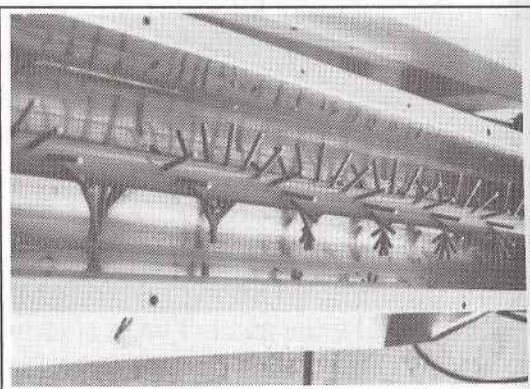


fig. 7.2

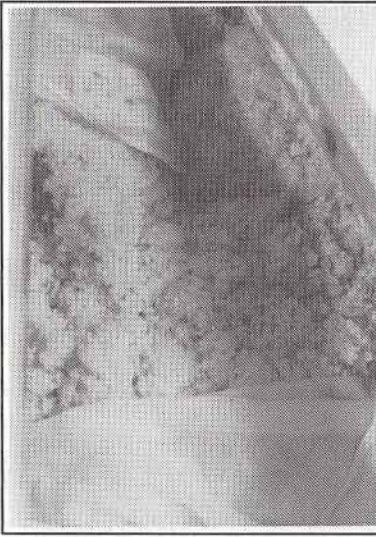


fig. 7.3

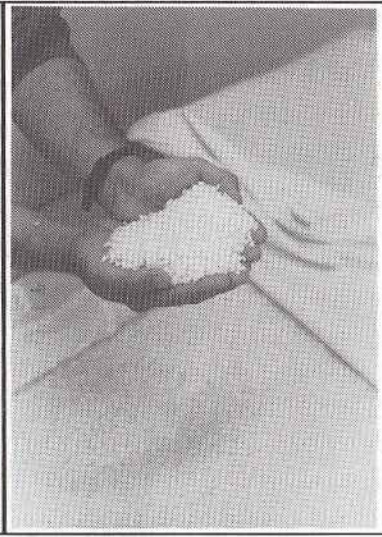


fig. 7.4

dividual fermenting tanks. Fig. 7.7 *Moromi* ferment fifth day, showing a very active odori (“dancing”) ferment, which has slowed considerably by the sixth day (Fig. 7.8).

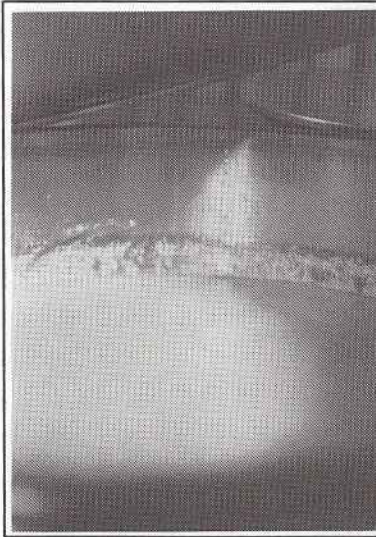


fig. 7.5

After 25-days, the raw sake is pressed (fig.7.9) and filtered, following which the sake is aged in storage tanks for two to three weeks longer (fig. 7.10). Quality control is verified in the laboratory, (fig. 7.11). California Ki-Ippon sakes are contract bottled by a nearby wine bottling company.

酒



fig. 7.6

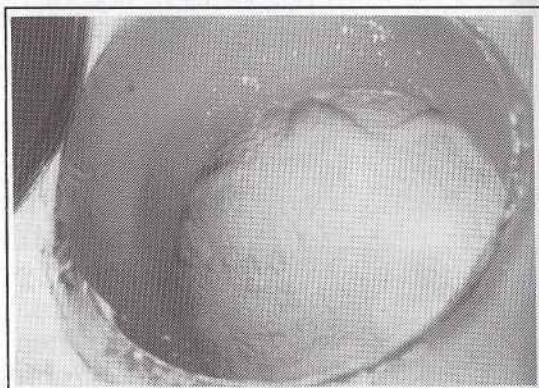


fig. 7.7

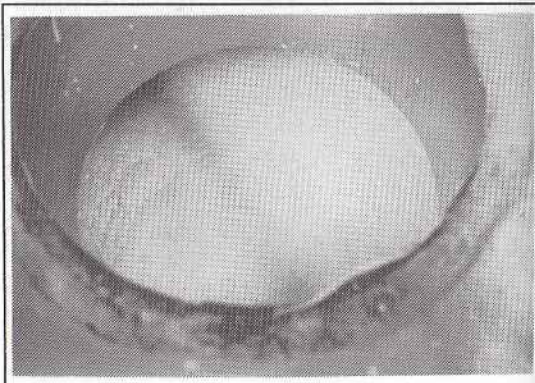


fig. 7.8

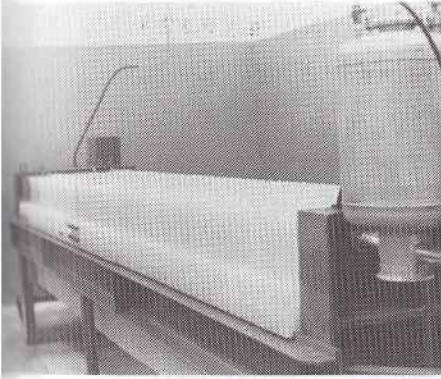


fig. 7.9

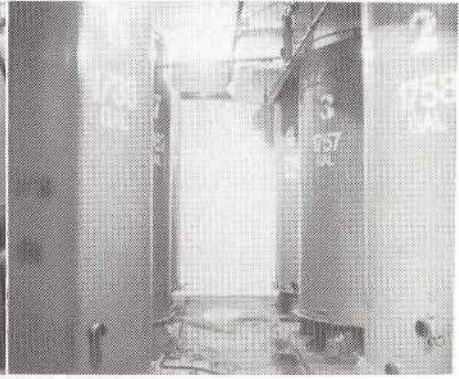


fig. 7.10



fig. 7.11

酒

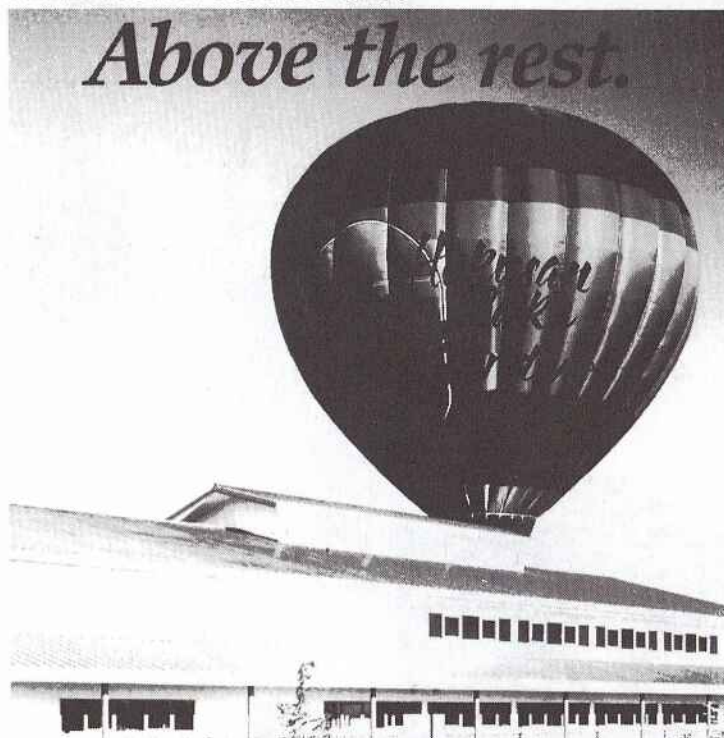
Napa

32. Kohnan Inc. 1990

BREWERY NAME: KOHNAN, INC.

Type: small regional

TELEPHONE: 707/258-6160



ESTABLISHED: 1987, first sales March 10, 1990.

CHAIRMAN OF THE BOARD: Mr. Yuichi Hombo.

PRESIDENT: Mike K. Iwasaki.

TOJI (brewmaster): Hisato Nishi.

MARKETING AND PR DIRECTOR Michael Chramko

ADDRESS: One Executive Wy, Napa CA 94558

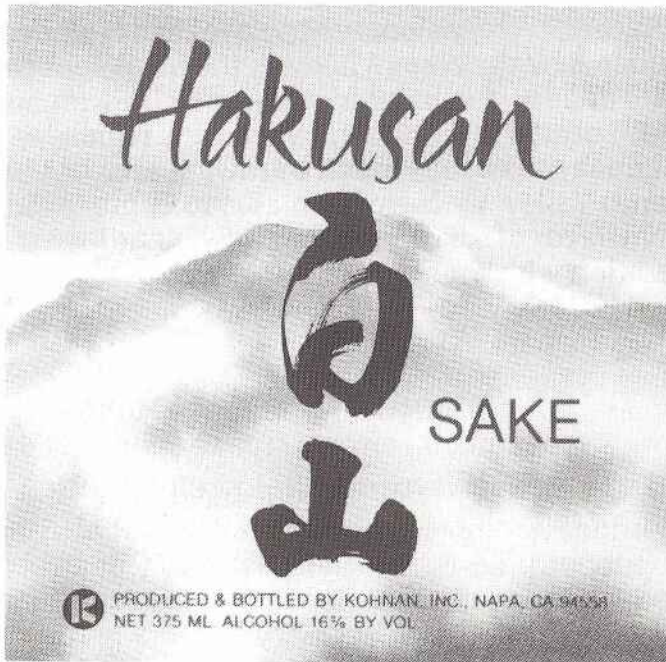
PRODUCTION FIRST YEAR (1990): 150,000-USgallons
Brewsize 3000 gallons. Capacity: 150,000 soon to be
quadrupled to 600,000 U.S. gallons.

BRANDS:

<i>ABV%</i>	<i>SMV/s.g.</i>	<i>Acidity</i>	<i>color</i>
Hakusan Mild Sake 1991 (our analysis):			
14.5	+3/0.998	0.9/0.13	0.2.
Hakusan Premium Sake 1991 (our analysis):			
16	+4/0.997	1.3/0.18	0.15
Hakusan Sake 1991			
16	+3/0.998	0.9/0.13	0.2
Hakusan Sweet Blossom Sake 1991 (our analysis):			
15	-73/1.0505	1.2/0.17	0.2

Hakusan Premium won double gold at Cal State Fair 1991. There is also a **Kohnan Mirin** and private label **Matsuhisa Sake** for a restaurant in Beverly Hills. A plum wine is scheduled for June 1992

BEST SELLER Hakusan, name means "White Mountain," serve cold 45°F/7°C or heated to about 110°F/



Sake (USA)

43°C. Sold in 20liter cartons, and 1.5liter, 750ml, and 375ml sizes.

TASTING ROOM: Daily 9 - 6 Monday through Sunday
Next to the tasting room are the Zen Temple-style Hakusan Sake Gardens.

TOURS: Daily 10 - 6 M-Su

DIRECTIONS: Junction Hy 29 & 12, across from Napa Valley Airport, entrance from N. Kelly Rd.

BREWERY MARKET AREA: Company plans nationwide distribution

COMPANY INFORMATION: Company has no connection with Japanese sake breweries. Parent company Minami Kyushu Coca Cola bottling Co., which has Coke franchise for Japan. Parent company is best known for its *shochu* (brandy).

EMPLOYEES: 41

BREWERY SAYS: The visionary Mr. Toyokichi Hombo, our founder, saw the Napa Valley as the ideal spot to realize his dream: the most modern sake brewery in the world. Located in world renowned wine region between San Francisco and the rice growing area of the Sacramento Valley, we have been able to capture the distinctive flavor of sake by successfully blending ancient tradition with modern technology.

酒

COLORADO

Golden

36. Hakushika 1991

BREWERY NAME: HAKUSHIKA SAKE BREWERY

Type: small regional.

TELEPHONE: 303/278-4200

ESTABLISHED 1991: projected to begin operations in July 1992

PRESIDENT S. Oyama

TOJI (brewmaster) Not named yet

BUILDING PROJECT MANAGER: Yoshi Nakamura

ADDRESS: 4414 Table Mountain Drive, Golden CO 80403

PRODUCTION: Brewery not operational yet.

Brewsize not available. Capacity about 160,000 USgallons.

BRANDS: not established Name means "White Deer"

Probable sizes 18liter;1.5l;750ml;375ml(label not available)

TASTING ROOM: a beautiful tasting room planned hours M-Su 10-5

TOURS will be offered daily

DIRECTIONS: No directions yet available

BREWERY MARKET AREA: Nationwide distribution planned.

COMPANY INFORMATION: Hakushika is owned by Hakushika, a Nada brewery in Japan.

EMPLOYEES: Number unknown

BREWERY SAYS: Company did not respond to our efforts to publicize their operation, probably because they are not far enough along in construction.

酒

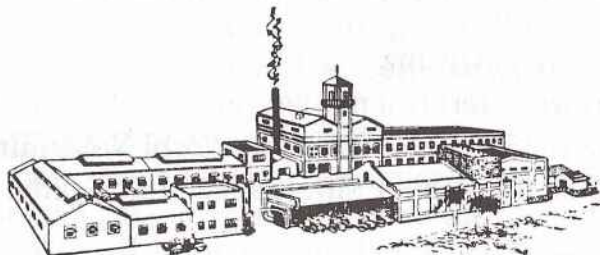
**HAWAII
Honolulu**

8d. Honolulu Sake Brewery (Takara-Japan) 1987

BREWERY NAME: HONOLULU SAKE BREWERY

Type: microbrewery

TELEPHONE: 808/537-9068



ESTABLISHED: 1908, oldest American sake brewery, see previous chapter for information on this brewery's history, and photographs of their production in 1975. Purchased by Takara April 1986.

PRESIDENT: Kosei Yamamoto.

OPERATIONS MANAGER: Ron Sumida, grandson of the original founder and builder of this brewery. Until 1986 his father, Shinzaburo Sumida was General Manager.

TOJI (brewmaster): Hideo Ebe.

ADDRESS: 2150 Booth Rd, Honolulu HI 96807.

PRODUCTION FIRST YEAR (1987): 150,000-USgallons.

PRODUCTION 1990: 200,000-USgallons.

Brewsize: about 1000-USgallons. Capacity about 300,000-gallons. Takara has been renovating and modernizing the brewery's equipment. The beautiful old rice polishers are no longer operational; the rice is purchased already polished (to 75%). There is now a com-

puterized filter/press and a semi-automated bottling line. They will install an automated rice washer and cooler in 1992.

BRANDS:

<i>ABV%</i>	<i>SMV/s.g.</i>	<i>Acidity</i>	<i>color</i>
Takara Masamune Sake 1991:			
16.5	+1/0.993	1.6/0.23	0.5
Takara Musume Sake 1991:			
15.5	+1/0.993	1.5/0.22	n.

The brewery also makes **Takara Masamune**, **Mirin**. The name duplication between original Hawaiian Takara and Japanese Takara is a coincidence. The company brews only their own original brands not those from Takara Japan or Takara (USA).



BEST SELLER: **Takara Masamune**, name means “Treasure Wine/Sword,” recommended serving tempera-

Sake (USA)

ture about 110-120F/43-49C. Sold in 19liter cartons, 3liter, 1.5liter, 750ml, and 375ml sizes.

TASTING ROOM: No tasting room allowed, City of Honolulu changed zoning in 1982 as revenge because the brewery won a suit (against the city) about right of way.

TOURS: none

LOCATION: Pauoa district

COMPANY INFORMATION: owned by Takara Shuzo Co., Ltd., of Kyoto, Japan, purchased in April 1986 with a "good offer" to stockholders.

EMPLOYEES: 30

BREWERY SAYS: We have enjoyed and treasured over 80 years of rich history and tradition. However, we have started to modernize and automate the plant to look ahead into the 21st Century.

酒

OREGON

Forest Grove

37. Momokawa 1992

BREWERY NAME: MOMOKAWA SAKE, LTD.

Type: microbrewery.

TELEPHONE: 503/357-7056

(photo not available)

ESTABLISHED: 1992, projected to begin operations in September 1994.

PRESIDENT: Griffith Frost.

TOJI (brewmaster): Kiyoshi Takahashi

BUILDING PROJECT MANAGER: Tomio Akutsu

ADDRESS: 920 Elm St, Forest Grove OR 97116.

PRODUCTION: Brewery not operational yet.

Brewsize 2113-USgallons. **Capacity:** 130,000 gals/year.

BRANDS: not established, but in Japan the company produces a wide range of sake types and sizes. Probable sizes 18liter; 1.5l; 750ml; 375ml; and 180ml.

TASTING ROOM: yes.

TOURS: yes.

DIRECTIONS: probable location of the brewery is in the Crann Industrial Park, south of Oregon 8 between Fern Hill Road and Elm Street

BREWERY MARKET AREA: National.

COMPANY INFORMATION: Momokawa is a good-sized regional brewery in Aomori prefecture in the northeast Honshu city of Momoishi.

EMPLOYEES: 12

BREWERY SAYS: Company wanted to separate themselves from the Japanese sake breweries in California, were attracted by low power rates, and nearby proximity of other Japanese businesses, plus the location is on local Oregon wine tasting routes. Forest Grove

municipal water is well suited to sake brewing. The company hopes to grow their own rice in Oregon, a first for that state. They plan to aim for the “Country Sake” market.

酒



BOOK THREE
THE ART OF MAKING JIU

酒

CHAPTER EIGHT

INGREDIENTS IN JIU: WATER, RICE, KOJI AND YEAST

WATER

Water is by far the largest ingredient in sake, not only as an ingredient, but for other procedures, such as washing, soaking, and steaming the rice, cleaning the utensils, etc. The water must be colorless, tasteless and odorless. The perfect water seems to be from Nishinomiya, a Japanese port city between Kobe and Osaka, in an area called Nada, and which is famous for the quality of its sake. It is so perfect that it is called *miyamizu*, "heavenly water." *Miyamizu* was identified by a Japanese brewer, Yamamura Tazaemon, in 1837 (49). Yamamura owned two breweries, one in Nishinomiya, and another to the west in nearby Uozaki. Yamamura found that his Nishinomiya brewery produced noticeably better sake, and wondered why. He was very careful to have his brewmasters follow the same procedures, and they used the same rice, the same water-rice-*koji* ratio, yet the Nishinomiya sake was clearly the better of the two. One season, he changed all of the tools and equipment in the Uozaki brewery, but it did no good, the sake was still inferior to that produced by his Nishinomiya brewery. The next year he rotated his brewmasters, with the Nishinomiya brewmaster going to Uozaki, and the Uozaki *toji* came to Nishinomiya. The results were the same. Finally he hired expensive ox-carts to trek water

from his Nishinomiya wells to the Uozaki brewery and vice versa, to the amusement of the other brewers. Voila! The new Uozaki sake was a huge success with the sake enthusiasts in Edo (Tokyo), the prime market for the Kobe-Osaka-Kyoto area sake brewers. This clearly established the role of water in sake production. The eastern brewery's water came to be called *miyamizu* and the name has stuck to that water to this day. Similar water is found in all of the famous sake producing areas.

Modern brewers adjust their water in the same manner that beer and ale brewers adjust theirs. *Miyamizu* is soft water with phosphates, potassium, medium amounts of sodium and calcium chloride, plus magnesium salts and, most important, it must have no iron (0.05ppm max), as that mineral will severely discolor sake. In our recipe, the Morton Salt Substitute and the epsom salts (magnesium sulfate), act as water adjustment, assuming the brewer uses iron-free soft (or distilled) water.

Water for Chinese Shao Xing type *Huang jiu* should be soft (50-70ppm hardness), pH 6-7, and less than 0.1ppm Iron.

RICE

Rice may be the most important grain in the world. According to Bor S. Luh (*Rice: Production and Utilization*), "The hope for better nourishment of the world's population will depend on the development of better rice varieties and improved methods for rice production and processing." Over 90% of the world's rice is produced and consumed in Asia. The U.S. grows less than 2% of the world's rice crop, but nevertheless accounts for almost 21% of the world's rice exports, ranking second only to Thailand. American rice feeds a lot of Third World people.

Rice is grown under shallow flood/wet paddy conditions because it benefits from standing water (flooding enhances nutrient availability). Aside from that, it actually has no greater water requirement than other field crops. The major rice growing requirement is a lot of sunshine and average temperatures of 68-100°F/20-38°C. It is grown in many rather temperate climates. It is clear that rice is America's least appreciated cereal grain. We put it in pudding, we pour milk and sugar on it and we brutalize it *a la* Uncle Ben. It's quite obvious that with rice we don't know what is good for us.

Be that as it may, the fact remains that rice is the heart of *jiu* in all its forms, but especially sake. Only the best will do, but just what is rice?

Well for one thing, it's a grass of the genus *Oryza*, a plant grown in over 100 countries and on every continent except Antarctica. It has been around for 10- 15-thousand years in some 20 species (*Oryza alta* to *O. schlechteri*), most of which were cultivated in China by about 5000 BC. Cultivation came later in India, SW Asia, SE Asia, Africa, Manchuria, Korea, and Japan. The Romans imported it to Europe, and in later years it was cultivated in Europe, Australia and the Americas.

Of the twenty species one, *Oryza sativa*, became dominant. There are three races of temperate *O. sativa*: *Indica* (from the Himalayas) which lead to *O. sativa Javanica* (Indonesia) and *Sinica* (China). *O.s.Sinica* is also called *Japonica*, but *Sinica* is more proper, since it originated in China, not Japan. However, most people think of this variety as *Japonica*, and that is the designation we will use here.

Although rice was introduced into the U.S. as early as 1609 (in Virginia), it wasn't successful until 1690 in South Carolina, and later in Louisiana, Texas, Central Arkansas, and more recently California.

The preferred rice type for *jiu* is the short grain rice, called *Pon Lai* in China and Taiwan. In this country it is

sometimes called "pearl" or "California pearl". *Oryza sativa Sinical/Japonica*, has a shorter fatter grain than any other rice variety. This is the cooking rice preferred by the Japanese, Hawaiians, Koreans, and many Chinese. The rest of the world, including most Americans, Latinos, and most Chinese, prefers the long grain types. For this reason, the short grain rice is not popular in the Eastern and Southern U.S., and may not be as easy to find outside of the Western States.

SHUZOOMAI (BREWING) RICE

In any case, one must ask, is there a "heavenly rice" to match *miyamizu*? Well, it seems there is a special brewing rice (*shuzoomai*) called *yamadanshiki*, and which originated in Hyogo prefecture in Japan, northwest of Osaka, near Kobe, and near to the Nishinomiya water source. *Yamadanshiki* rice is used to make two-thirds of all Japanese sake, and it is these farmers that the Japanese government is protecting. They and their rice are indeed a Japanese National Treasure. The Japanese government excludes all imported rice to protect these small farmers. If our government was as protective of small American farmers, maybe our agricultural economy would be in much better shape, and our small farmers would be prosperous instead of going broke, but I digress and editorialize.

Yoshizawa and Kishi⁽¹²⁾ tell us "...rice has neither a characteristic flavor nor a profound effect on the flavor of sake." Flavor comes from the brewing process, and rice that works well is given preference over rice with flavor. High sugar yield, ease of polishing and steaming, and suitability to *koji* production are much more important, as are protein content, water absorbability of the grain, kernel size and moisture content. There is a close correlation among the kernel weight, the protein content, the fat content, the speed of ab-

sorption of water during steeping, and the formation of sugars by the action of the *koji* amylases.

The main reason that short fat rice grains make better *jiu* is based on the fact that the rice must be polished for best results, and short fat grains are easier to polish successfully than long thin grains. Polishing is necessary because the outer layers of the rice grains (aleurone layer of the endosperm) contain a much higher protein and crude lipid (fat) content, which has the effect of adding a variety of amino acids to the ferment and of generating strange off-flavors. The high nutrient content of the aleurone layer often has the effect of inviting many strange bacteria into the ferment, and these will also contribute to negative flavors in the finished *jiu*. Long grain rice varieties, even if they were to polish as well, have the additional defect that they form less sugars in saccharification and contribute odors to the finished *jiu*. One further factor seems important: the best brewing rice makes poor cooking rice. When prepared as dinner rice, it is relatively tasteless.

The *yamadanshiki*, a short grain rice type meets the highest criteria better than any other rice strain. As in all short grain rice, endosperm cells are arranged loosely, and have a center cavity filled with starch granules instead of endosperm cells. The *yamadanshiki* rice is fatter and has a greater 1000-kernel weight: 28gm to 20-22gm for other short grain varieties, with 71% starch vs 69%, and less nitrogen. *Yamadanshiki* rice absorbs water quickly and steams better to produce more sugars and less amino acids in the mash and ferment. If all that is so, why isn't the *yamadanshiki* rice type grown outside of Japan? Most Japanese farmers, it seems, decline to grow *yamadanshiki*⁽³⁶⁾, probably because there is no general market use for this rice, aside from sake brewing. That may be the reason it is not grown in this country. Another possibility is that the variety may not do well outside its native area in Japan.



Fig. 8.1 Japanese Yamadanshiki rice polished (l) and unpolished.

WHAT ABOUT AMERICAN RICE?

The question naturally arises, how good is American Rice? There are many opinions on that subject. The Honolulu Sake Brewery used California short grain rice right from the start (1908), and their product has always been fairly good, although not quite as good as Japanese sake (according to the Japanese experts). There is reason to believe that California rice has improved in recent years. All of the American sake breweries use California rice, and collectively or individually, their product is actually quite good. However, at least one Japanese brewery considering building an American brewery, did a study on using American rice, doing test brews and the like, and comparing their own local rice (not Yamadanshiki rice) to the

California rice. They concluded that the kernel structure of the California rice was inferior in a number of ways which would seriously effect the polishing possibilities of California rice. But their biggest complaint was that the California rice had a much higher potassium content, 1.5 to 2.5 times higher than their local Japanese rice, which itself has a reputation for being the highest in Japan in potassium content. The high potassium content speeds up the fermentation process, and is the greatest drawback in using California rice.

Of course, the American sake breweries do very well with American rice, so perhaps these difficulties can be minimized by improved farming methods, once the sake breweries get together to set standards for American rice farmers.

RATE OF POLISHING THE RICE

The quality of the sake depends to a great extent on the rate of polish. The rate of polishing is determined by the following formula:

$$\text{Rate of Polish} = \frac{\text{weight of white rice obtained}}{\text{weight of original brown rice}}$$

Ordinary dinner rice is polished to 90 or 91%. This is the rice available for making homebrewed sake. Chinese Shao Xing *jiu* uses rice polished to 80%, ordinary sake 70-75% polish, superior sake 50-60% polish, and *dai-ginjo* sake more polish than even that, sometimes to 30-40%.

The main purpose of polishing rice is to remove undesirable elements: crude fat reduces itself most rapidly, while protein content decreases gradually until the polishing ratio reaches 50%, then it remains more or less constant. Brown rice has 7-9% protein, and 2.5% crude fat, but at 75% polish protein is reduced to 5-6%, and crude fat is reduced to 0.085% (it's

0.8% at 90% polish), the fat reduction is a further 50% resulting from the steaming process, and the changes are phenomenal with certain types of protein. The changes in protein composition, from the rate of polish, the steaming process, and the ferment itself have interesting results. During the ferment, acid protease in *koji* decomposes proteins to form peptides and amino acids, which may be assimilated by yeast, and which heightens the activity of the yeast to give sake its full heavy taste, but an excess gives sake a rough taste, deepens the color, and accelerates the deterioration of quality in the final product. Some amino acids are assimilated by the yeast to form higher alcohols, especially isoamyl acetate, one of the main flavor compounds in sake taste and aroma.

The mineral content of rice is seriously reduced by polishing, especially that of phosphorous and iron (which can have a very deleterious effect on the taste).

The net result is that polishing removes some of the bitterness in the taste, and greater polishing results in a noticeably smoother taste profile in the finished product. This is why ginjo sake commands such a high price. It is very much more expensive to polish the rice, because the loss is not just in the material polished away, but in the fact that the grains are subject to greater stress, crumble, and must be discarded. This can double, triple, or quadruple the cost of this basic raw material.

THE STEAMING PROCESS

While being washed, the rice grain will absorb up to 17% of its weight in water, and by the end of the long steep may gain up to 30% of its weight in water. This promotes the penetration of heat during the steaming process.

The long steaming process is necessary because

it enables the starches in the rice grains to turn to their alpha forms (allowing them to be converted readily to fermentable sugars). The steaming process also alters the protein structure, allowing it to be changed in the ferment. In addition, the structure of the endosperm is partially destroyed, and of course the grains are sterilized. It takes the whole forty-five minutes to remove the fatty acids. The grains also absorb additional water in the process.

The question arises, why not cook the rice, as is done with dinner rice? The answer is that cooking the rice causes the kernels to stick closely together in a gooey mass, while steaming the rice keeps the kernels separate so that the various ferments can take place readily. There is also the fact that cooking large amounts of rice can be quite demanding, whereas steaming is relatively easy to manage. Can you imagine the difficulties involved in cooking 1000-lbs of rice?

GLUTINOUS (WAXY) RICE

Glutinous rice, also called “sweet rice”, and technically “waxy” rice, has large full grains, is waxy, lustrous and almost shiny. It has a higher level of free sugars specifically malto-dextrins (hence the name “sweet rice”), and it lacks amylose (soluble starch), hence its glutinous quality (the grains blend together as dough). It is from a recessive gene of *oryza sativa Indica*, and is not used in sake, but it is used in some Chinese huang *jiu*s notably Shao Xing *jiu*, and sometimes in Mirin or sweet cooking sake. Glutinous rice must be polished in the same manner as regular rice. Glutinous rice is also found in long grain varieties. The short grain glutinous rice is the one the Chinese use in their *jiu*.

OTHER CEREAL GRAINS USED IN JIU PRODUCTION

Cracked wheat is used in Chinese huang jius and millet is sometimes used in other Chinese jius. I have tasted corn sake, and there is no good reason why most cereal grains could not be adopted to *jiu* production. The problem inherent to all these is that they work better when the *koji* is of the same cereal. Shao Xing *jiu* is made from rice, glutinous rice, and wheat, but the starter used is from both rice and wheat *koji*.

KOJI

The production of *jiu*, especially sake, begins with the making of *koji*, or a variant of that. Koji is rice inoculated with *aspergillus oryzae Globosus*, a mold similar to *penicillium*. In other countries, other molds are used (9), including *rhyzopus*, *mucor*, *monila*, *aksidia*, *monascus*, and *penicillium*. The Chinese use *aspergillus oryzae Shao-xing* to make that beverage. There is a Chinese product called *meng* or *chiu* (labeled "dry yeast" in some chinese markets). This has the mold plus yeast and *lactobacillus*, whereas *koji* does not have yeast. These are small marble-sized balls (sold in packets of 2). They are used as both yeast and *koji*. The Chinese also use a variation of *koji* they call *kyoku-ji*, which like *koji*, has no yeast, and which is used in the same manner as *koji*.

According to Takao Nihei, former *toji* (brewmaster) of the Honolulu Sake Brewery, *koji* is the most important ingredient in sake production. The *koji* has a profound effect on the final product, especially so since it is 25% of the total rice volume in sake. Sake breweries typically use two different types of *koji*, one for *moto* (starter mash production) and another for the main ferment.

The production of Koji begins with the manufacture of *tane* (seed) *koji*. Shurtleff and Aoyagi (10) describe both *tane koji* and *koji* production in the home in their wonderful book. This book has all the information (including sources for the mold culture) the reader may need to produce *koji* at home, should he or she desire to do that.

Tane koji is made from lightly polished short grain rice, some oak or beech ash, and *aspergillus oryzae* culture. The rice is steamed for an hour, and the ash is added. The mass is cooled to 77-81°F/25-27°C, the culture is added, and the mass is then covered with a sterile damp cloth. Culture is green to yellow green, and is dried and stored until used. One pound of *tane koji* will make a hundred pounds of *koji*.

In the production of *koji* the short grain rice allows for better growth of the *aspergillus oryzae* mycelia to invest the grains to a greater degree for better modification. Dr. Donselt⁽²²⁾ has a good description of the process of making *koji* in 1905, it also provides a good description of the rice milling process at that time:

The rice which is employed in this production is hummeled or awned (i.e. pounded), but not cleansed. The grains of rice are then poured into a wooden mortar constructed in the ground, and then crushed by means of a (large) wooden hammer or pestle, which is raised with the aid of a lever or hoisting jack and drops upon the rice by its own weight. In this way the grains are ground together and against each other, the husks, and generally also the germs, being thus removed. If the grains have been sufficiently pounded, they are sorted, the whole grains being separated from the broken ones and from the bran. Only the former are utilized for the preparation of "*koji*" of the finest quality. The loss in this operation amounts to about 25 to 40 per cent (60-75% polish). The whole grains are then washed as frequently and as thor-

oughly as possible, in a basin with water until they have become entirely clean. They are then allowed to soak for a full night, when they are poured into a kind of clarifying vat, the bottom of which is pierced by holes and covered by a cloth lining. Steam is conducted into this clarifying vat from below, in order to gelatinize the starch of the grain. The procedure is usually that of placing the clarifier upon a large iron boiler in which water is heated. The germs which were not removed in the previous steeping are now separated off, and the rice becomes flexible and assumes a uniform horny appearance.

This "*mi*," as the Japanese call the mass thus prepared is then spread out upon mats, being thus cooled to a temperature of 20°C (68°F). A yellow powder, called "*tane*," is now added to the grains, consisting principally of the spores of a mold fungus, *aspergillus oryzae*, but which also contains several cells of a peculiar yeast. After this powder has been thoroughly mixed with the boiled rice grains, the mixture is allowed to remain at rest for about twenty four hours in the coldest part of the cellar at a temperature of 26 °C (79°F), and an additional period of about twelve hours in the rear part, spread out in a thin layer upon wooden plates. The contents of each plate are then gathered together in little heaps, which are left untouched for five to six hours. In the heap there is naturally a considerable rise in temperature due to the development of spores; the mycel formed envelops the rice grains, and unites and joins them together to a compact mass. To avoid too great a generation of heat, the heaps are spread out several times, allowed to cool, and then gathered into heaps again, subjecting them to vigorous stirring at frequent intervals. The "*koji*" has acquired a temperature of 15-27°C (59-81°F), depending upon the conditions of its sojourn in the cellar, the temperature of the air in the cellar varying from 8-13°C (46-55°F).

In the preparation of rice beer, the "*koji*" is used in a similar manner as the malt in the production of

beer. In most cases, the sake brewer prepares his own "*koji*." The cellars which are employed in the preparation of "*koji*" are in general situated 5 to 6 meters (15-18-ft) under the ground. Access to these cellars is usually so arranged that a long passage must first be traversed, whereby too rapid a cooling of the cellar is avoided. If the cellar has been empty for a while, it must first be heated for the manufacture of "*koji*," but later on the heat generated by the mold-fungus usually suffices to keep the cellar at the desired temperature. In the upper part of the passage a warm current enters from the ground, so that provision is always made for a renewal of air in the cellar.

The growth of the fungus lasts about 36 to 48 hours, and during this time, through its enzymatic activity, the starch of the grain is in part converted into maltose and dextrose.

Microbiologists have found about 50 kinds of enzymes in *koji*, but the important ones are sugar-producing amylases (alpha-amylase and amyloglucosidase) and protein-reducing proteases, plus acid- and alkaline- proteases. The acid-protease is especially important as it acts to decompose protein and form amino acids which have an important effect on the final taste. The process of brewing sake begins after the production of *koji* is finished.

SAKE YEAST

The word "yeast" is from the Greek: *Zestos* (boiled), and Sanskrit: *Yasyati* (it seethes). Yeast is an egg-shaped single-cell fungus. It contains no chlorophyll, and cannot manufacture its own food supply from carbon dioxide and water as plants do. The production of beer, wine and *jiu* would be impossible without yeast. Fortunately there is no problem in this regard since yeast is universally present in all parts of the world including the Antarctic.

Louis Pasteur was the first to establish the scientific role of yeast in the fermentation process by his studies from 1857 to 1868. This information was expanded by Emil Christian Hansen, a Danish brewer, from the Carlsberg Brewery of Copenhagen. By 1890 Hansen had established procedures for isolation and cultivating a pure yeast culture from a single cell, and its use in the production of better beer.

THE ACTION OF YEAST

Alcohol fermentation will take place in either the presence of, or the absence of oxygen, but if the yeast gets plenty of oxygen, it will reproduce itself more quickly, and increase its metabolic activity. Under these *aerobic* (with oxygen) conditions it will not produce much alcohol, but the yeast colony will grow and multiply rapidly. This growth and reproduction can take place only under the above mentioned aerobic conditions. That is why we need oxygen early in the fermentation process to produce an active yeast colony. Later in the ferment the production of carbon dioxide will naturally exclude oxygen, forcing the yeast to obtain its metabolic energy from alcohol fermentation, hence the alcohol production after the ferment has produced an early surplus of CO₂. At this stage life barely turns over. Alcohol production reaches its maximum under these *anaerobic* (without oxygen) conditions.

The exclusion of oxygen, late in the ferment, is very important to the continued production of alcohol, and indeed oxygen is damaging to wine, beer, or *jiu*. For this reason we move (rack) the *jiu* from its rice lees to closed fermentors (usually bottles in amateur *jiu* production), and why fermentation locks are attached to the fermentors at that time. This stage is called secondary ferment, and continues until the fer-

mentable sugars have been used up, or until stopped by a surplus of alcohol in accordance with the maximum toleration of the particular yeast strain(s) in question. The maximum alcohol toleration of most yeast strains is rather modest. Many beer yeasts will reach a maximum of 8 or 10% alcohol before they max out, while wine yeasts will sometimes go to 15% (i.e., in the production of sherry). These maximum tolerances can sometimes be increased by adding sugar slowly to the ferment. When this is done in wine-making it is called a syrupe ferment, and that is exactly the role *koji* plays in the sake ferment. *Koji* slowly converts the starch in the rice to fermentable sugars, and the yeast will continue to convert such sugar to alcohol to 20 or 21% in some cases, which is long past the time it would continue to do that in the production of wine or beer. Even wine yeast will perform well in this situation—which is why wine yeast may be used in sake production. The preferred sake yeast is available, however.

Sake yeast is a variant of *Saccharomyces cerevisiae*, but it has different vitamin requirements, and different sugar and acid tolerance and adaptability to anaerobic conditions, and it readily dominates any ferment. For these and other reasons, sake yeast is the desired yeast to be used in sake and *jiu* production. Fortunately it is now available on the homebrew market.

酒

CHAPTER NINE

MAKING SAKE AT HOME

This recipe has been a long time evolving. I first formulated the method in 1973 for an advanced home winemaking class I was teaching at that time. Our procedures in this recipe are based on time-honored Japanese production methods from antiquity as postulated in the *Tamon'in Nikki* out of 1599. Our method is basically from two sources. The best source (for our purposes) was two articles in old issues of *The Scientific American Supplement*, by Bellows, the American Consul in Yokohama⁽¹³⁾ and another⁽²¹⁾, by a German, Dr. Donselt. These two articles were very good sources, because the methods used at that time were quite similar to those used in the 18th and 19th centuries by Japanese Sake Breweries. Another article, "Sake Brewing," by Kyoko Ohwaki and Michael Lewis in the now defunct *Wallerstein Laboratories Communications*⁽⁶³⁾, gave good details on modern commercial methods.

In 1982 I revised the article for a presentation at the AHA conference in Boulder, Colorado, and it was published at that time⁽⁵⁾. The present form is only slightly modified from that. This sake recipe has been brewed by a good number of brewers, and I have tasted some very good results from their efforts. My own sake has been quite satisfactory. My only caveat about the recipe concerns the water additions for making weaker jiu's. I have very little interest in weak or so-called "light" sakes, and have not tried the 12% or 11% variations; the water additions are only calculations. Someone else will have to prove those, take care, because water added cannot be removed. I did

make the 14% stuff and was thoroughly disappointed with the resulting weak beverage. I have not had time to try the “sparkling sake” before this book goes to press. I have made sparkling wine, however, and the methods work for that beverage, I see no reason why they wouldn’t work for sake “Champagne.”

I admit the procedures described appear somewhat complicated, but I can assure you it is not as difficult as it seems at first glance. For the most part the brewer is expected to use standard home winemaking procedures. I have tried to describe these completely, for the majority of my readers who may be experienced beer makers, but who might have never made wine, or sparkling wine.

One final note on the recipe: I urge the reader to follow the procedures outlined below very carefully the first time through. The long slow buildup of the *moromi* ferment is necessary to assure the highest alcohol content, and the fullest conversion of starches. Failure to do so may result in a much sweeter and weaker end product.

THE ART OF MAKING AUTHENTIC SEISHU, REFINED JAPANESE SAKE, AT HOME— KAN-ZUKURI (COLD-BREWED) METHOD

As we have shown, sake is unique among fermented beverages, in that the sugar is being produced from starch—by mold enzymes—simultaneously with the fermentation process—by yeast and lactic acid bacteria. Because of this simultaneous action, the alcohol content can be very high: 18-20% by volume. The accompanying light lactic acid ferment (to about 0.5%, as tartaric) lowers the pH to good fermentation range, and contributes to the distinctive sake flavor. Because of the unique temperature requirements of

the ferment, it is best to make sake during the period from late fall to early spring, or in modified refrigeration allowing temperature control in the 50-60°F/10-15°C range.

EQUIPMENT NEEDED

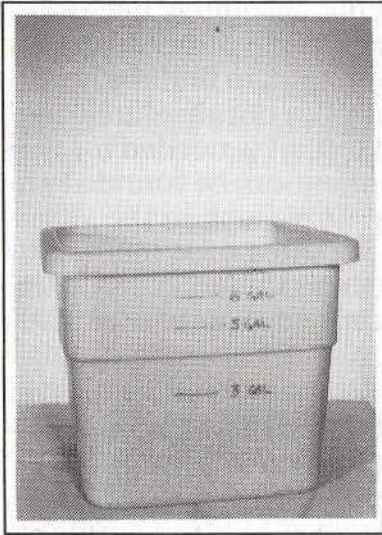


Fig. 9.1. Plastic fermenter (food grade about 8-gallon capacity).

You need normal winemaking equipment: a five gallon, food grade plastic, open-topped primary fermenter, and a plastic sheet to cover same; several (6) closed secondary storage vessels such as 1-gallon or 4-liter bottles or alternately a 3-gallon glass carboy; about seven feet (2.1m) of $\frac{3}{8}$ -inch (9.5mm) plastic siphon hose, and several fermentation locks. You will also need a fairly large



Fig. 9.2. Aluminum Steamer (45cm size).

steaming vessel of at least 2-gallon capacity (about 40cm/15.75"). Good steamers are found in most Asian (Chinese, Korean, Japanese, Vietnamese, Thai or Cambodian) grocery stores. Here in Portland they sell for around \$30.

A small plastic or wood wine press would also be useful. It is desirable to determine the specific gravity later in the ferment, but not absolutely necessary. A specific gravity hydrometer and hydrometer jar are needed for that job. It is also useful to find the acidity of the finished sake, but that too is not absolutely necessary. A winemaker's acid test kit is needed for acid titration. Most of this equipment can be found at any beer or winemaking supply store (look in the yellow pages under Beermaking Supplies or Winemaking Supplies). Information on where to find specialty ingredients and equipment is provided at the end of the next chapter.

CLEANLINESS AND STERILIZATION OF EQUIPMENT

All of the equipment used in the fermentation, pressing or bottling of the finished or fermenting product must be absolutely sterile. A sterile solution can be made using a tablespoon of household chlorine bleach (5.25% sodium hypochlorite) in a gallon of water (200 ppm). Rinse the equipment carefully in this solution, and allow to drain completely before using. No water rinse is necessary, as this low concentration will dissipate soon and will not leave any flavor in the finished sake. See the end of this chapter for wholesale and retail ingredient sources.

INGREDIENTS

(single recipe—may be halved, doubled or tripled)

U.S.	item	metric
10-lbs	California Pearl or short grain rice	4.54 kg
2x20oz	cups Cold Mountain Rice Koji	1.14 kg
2-USgal	water	7.6 liter
3/5 tspn	winemaker's yeast nutrient	4gm
pinch	epsom salts (magnesium sulfate—MgSO4)	0.6gm
1.25 tspn	Morton Salt Substitute (only)	6gm
yeast	Wyeast lab sake yeast OR	
packet	Red Star Montrachet or Sherry yeast	packet
finings	Bentonite or Sparkolloid	packet

(Makes about two to three gallons of sake depending on the final alcohol content.)

The rice used must be polished short grain rice (*Oryza Sativa: Japonica* variety), sometimes called California pearl. Don't be cheap get the best. Commercial polished rice is generally polished to 90% of its original volume and, as mentioned earlier, good sake rice would be polished much more than that (to 50-75% of the original volume). In any case you should carefully measure each portion. Measurements are given by weight and also volumetrically, by the cup, since the relationships are volumes of ingredients rather than weights.



Fig 9.3. Ingredients for making sake: pure water, short grain rice, koji.

Water for sake should be soft, with no iron in it. If the tap water is not soft and iron free (ask your city water department), use commercially available distilled water.

At this time I have never tried any rice polishing method at home, but the reader might wish to experiment with various ways to polish the rice further, such as using rock polishing equipment. A friend, recently discharged from the Marine Corps, told me how they polished their discarded "brass" bullet casings, so the Marine Corps could re-use them. These fellows put the brass into a cardboard box, placed that in a clothes dryer, and packed pillows around it to keep it in one place. Then they turned the "dryer" on, with no heat, and allowed the box of shell casings to tumble for an hour or so. The result was highly polished "brass." If you are interested, remember to weigh the rice first, and again following your "polishing." The formula for determining the final polishing rate is as follows. Divide the finished rice weight (after discarding the bran) by the original weight. This will give you the pol-

BROWN RICE (GENMAI) SAKE

Brown rice can be used, but it is not recommended. Brown rice has too many nutrients, proteins and fats, which will encourage souring infections in the ferment. If you insist on making *genmai* or brown rice sake, follow this recipe, but add 10% more rice in all additions, and soak each addition for 36-45 hours (instead of 18) and you must steam the rice an hour-and-a-half to two hours (instead of 45-minutes). Check the progress of steaming by squeezing a grain between your fingers. It should squeeze under pressure, but squishing easily indicates too long a steam. Finally, leave out the nutrients mentioned below.

ish rate, then take 90% (the assumed commercial polish you started with) of that for the final polish rate. Assume you have started with 2-lbs rice (32-oz), and you polish it until it weighs 27-oz.:

$$27/32 = 0.844 = 84.4\%.$$

$$90\% \text{ of } 84.4\% = 76\% \text{ total polish rate.}$$

This should make a respectable sake.

Most of the other ingredients are easily obtained, but the special rice-mold, *koji*, is available at only a few winemaking and beermaking suppliers, and it is the most expensive ingredient. A list of koji outlets is found at the end of the next chapter, and is updated regularly in the *Sake Connection*. Most Japanese grocery stores carry *koji*, but they wouldn't have sake yeast.

The yeast nutrients needed are epsom salts, **Morton Salt Substitute**, and regular winemaker's yeast nutrient. These special nutrients are necessary because there are very few nutrients in polished rice. The **Morton Salt Substitute** is the only one with the right concentration of proper nutrients: potassium chloride, fumaric acid, tri- and mono-calcium phosphate. Other salt substitutes are not to be substituted for the **Morton** product.

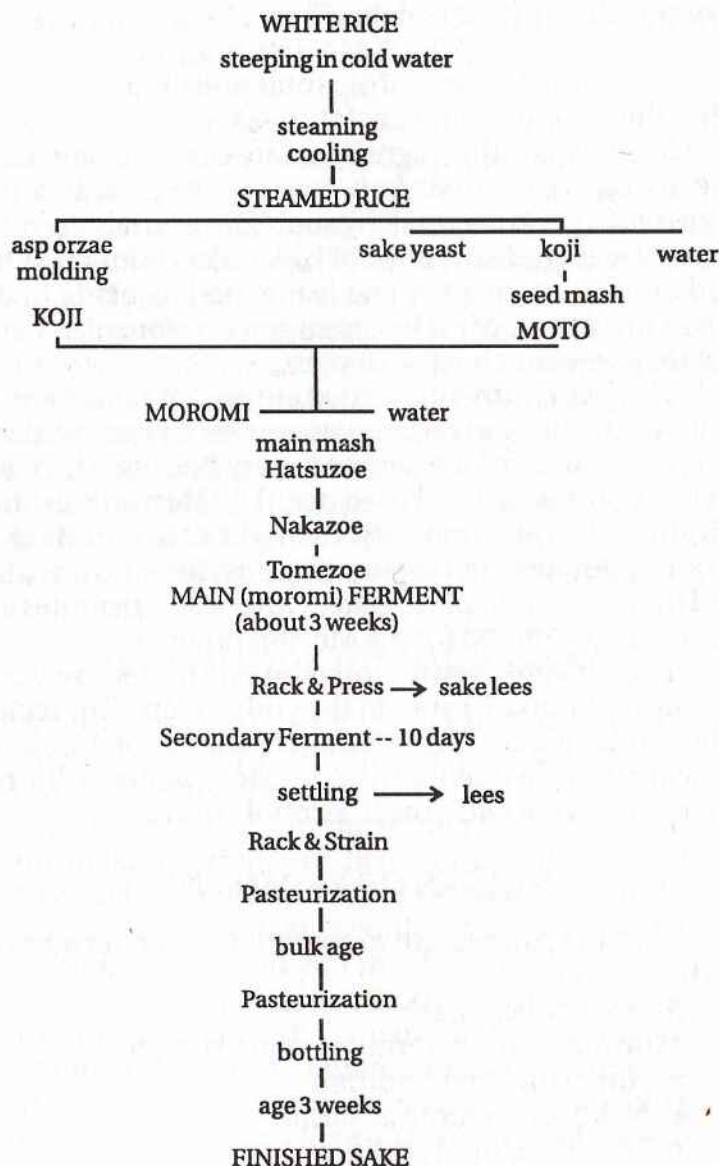
The alcohol content may be controlled by varying the addition of water, in the *yodan* step. Our recipe will produce 2.67-USgallons (10.1-liter) of 18.5% to 20% alcohol (by volume) sake. More water will produce more sake with lower alcohol content.

STAGES OF FERMENT

The ingredients are assembled in the fermenter in five increments:

1. **Moto** or yeast mash.
2. **Moromi** or main ferment, consisting of
 - a. **Hatsuzoe**, first addition
 - b. **Nakazoe**, middle addition
 - c. **Tomezoe**, final addition.
3. **Yodan** or stabilizing addition.

Sake Home Brewing Flow Chart



The various stages of fermentation require different temperatures. These can be as low as 40°F (4.4°C) which would probably require refrigeration, and warmer (50-60°F/10-16°C) which might call for a cellar, or at least a cooler time of the year, such as fall-winter-spring. Some ferments are done as warm as 74°F/23°C which would need a warm room. I solve these problems by fermenting in the winter and moving the ferment about my house to achieve the necessary temperatures for the various stages. Temperature control is essential to making good sake. If it gets out of hand, you could have some very strange flavors ruin your sake. This is because sake is very susceptible (especially in its early ferment) to a variety of infections. Be sure to taste your sake from time to time, and take notes about the flavor, to keep track of any off flavors which may show up. Fermentation flavors in sake can be very intense, so do not be surprised. Off-flavors may be difficult to identify, which is why one must keep notes. As the ferment progresses you will be able to get a better idea of what is going on in the ferment.

PREPARATION OF THE RICE

For each addition prepare the rice as follows:

1. Wash the rice completely and thoroughly in running cold water to remove all starch powder.
2. Cover the rice with 2- 3-inches (50- 75mm) of very cold water, and stand in your refrigerator to soak for about 18-hours before using. Properly soaked rice is slightly less than crunchy and nibbles easily (if it's squishy it has soaked too long, if very crunchy it's not soaked long enough).
3. Drain off the cold water, and place the rice in the steamer—which must have *plenty* of water in the bottom to allow for the long 45-minute steam. The rice is not boiled, but steamed, separated

above the boiling water in the steamer. Steamed rice is ready when it is not quite *al dente* (as for spaghetti), it should not be soft and gooey as cooked rice is. After steaming, the grains separate easily, although they do have some tendency to stick to each other.

4. The koji for each addition (except that for the very first step, the moto or yeast mash) is always *added to the mash* 12 to 18 hours **before** adding the rice for that addition. **Add the koji portion, for each addition, directly to the fermenter** at the same time that you set the rice, **for that addition, to soak in the refrigerator.**

MOTO OR YEAST MASH

(total time 14-days)

I recommend the original Japanese *moto* method for beginning the sake making process. As I always do in my writing on wine and beermaking, I have adhered to the older and more traditional procedures in recommendations, especially in the **Moto** preparation, and the “hands-on” kneading at each of steamed rice addition, which is followed by many Japanese breweries in Japan, but which has been abandoned by modern mega-brewers in Japan and their American subsidiaries. The old Japanese brewers had calloused hands, because the freshly steamed rice was *hot*, but our much smaller quantities are not that hot at all. Anyway, the hands-on mixing is very important according to all the old *toji* (master brewers), they swear by it—dare you do less? After the rice clumps have been dissolved continue stirring with a spoon for a total of 30 minutes.

All of the quantities are volumetric. The reader can safely use the cup measurements found in the recipe, and be assured that the end product will be quite satisfactory (assuming time and temperature

recommendations are adhered to).

1. Prepare 1½ cups (12-oz/340gm) rice as described above (wash, soak, steam).
2. Prepare 2½ cups (20-oz/620ml) cold water by adding the yeast nutrient ($\frac{3}{4}$ tspn), and Epsom salts (pinch). Stir them to dissolve completely in the water. Next, add 7½ tablespoons of (3.75-oz—106gm) of *Koji* (just under ½ cup). Stir this into the water, and place the mixture in the refrigerator at about 40°F (4.4°C) or so, while soaking the 1½ cups of rice (#1 above—18-hours).
3. Steam the rice and add the chilled *koji*-nutrient mix to the hot steamed rice, to produce a proper starting temperature of around 74°F (23°C). Mix this in a small container thoroughly for about 30-minutes, and cover with plastic. Stir (using a metal spoon) twice a day for two days and keep the temperature up to about that level (74°F). The traditional ratios of *koji*:steamed rice:water volumes in the *moto* is 40:100:120. The volumes we recommend are standard U.S. measures, i.e. 1-cup = 8-fl oz/240ml, but standard Japanese or British measurements could easily be used, as the Japanese cup (Goh) is $\frac{2}{3}$ the U.S. cup, while the British cup is 10-oz. The final volumes would differ in each case, but the quality of the product would be the same.
4. After two days, cool to 50-60°F (10-14°C) and sprinkle the yeast on the surface. Do NOT stir in. Cover and stand for 12-hours at that temperature. The cool temperature at this stage is very important. See earlier temperature note.

NOTE: When using the WYeast packet it is not necessary to activate the nutrient packet—merely clip the corner and pour the yeast liquid onto the surface *without* using the nutrient.

5. On the third day (or after the above) raise the temperature to 68-74°F (20-23°C) and, with a spoon, stir the yeast into the *moto* mixture. Stir twice daily for three days, and once daily for three more days.
6. The basic ferment of the yeast mash is now finished, and the temperature is again lowered gradually to 50°F (10°C). Allow the *moto* to rest for about 5 more days. Total time 14 days. Now you are ready to start the main or **moromi** ferment.

MAIN (**MOROMI**) FERMENT

The *moromi* ferment will be a three-stage buildup over a four day period. The slow buildup is necessary to ensure a maximum alcohol content. The stages, or additions, are called first addition (*hatsuzoe*), middle addition (*nakazoe*), and *tomezoe* or last addition). Each consists of a further portion of *koji*, steamed rice and water. These sequential additions each double the volume of the mash until the full ferment can take place over about three-weeks. Specific procedures follow. The *koji*:rice:water ratio of the main ferment is 25:100:160

The buildup in three additions:

- I. First addition—*hatsuzoe*, and the *odori* or dancing ferment.
 1. Eighteen hours before the start, wash and soak 2½ cups rice (20-oz/570gm) in cold 36-40°F/2-4.4°C water, in the refrigerator.
 2. At the same time add a cup—less 1-teaspoon—of *koji* (7.5-oz/210gm) to the yeast mash (which has been working for 2-weeks). Stir the *koji* into the yeast mash.
 3. After the rice has soaked 18-hours, prepare it by steaming as described earlier.
 4. While the rice is steaming (45-minutes), dissolve

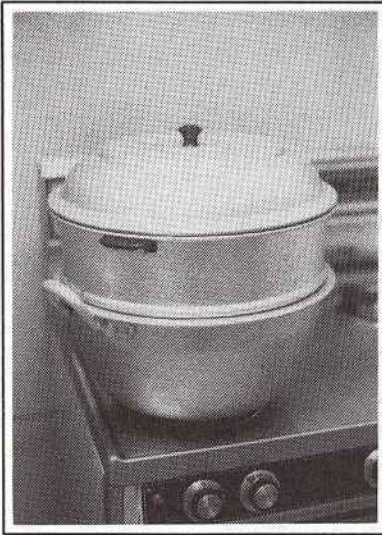


Fig. 9.5. Steaming the rice.

- 1¼ teaspoon *Morton Salt Substitute* in a little warm water, then add more water for a total of 2-¾ cups (22-oz/650ml), and chill to 40°F/4.4°C. Use ice if necessary to reach this temperature.
5. When the rice has finished steaming, add it to the cold water you have prepared, and when the mass has cooled to 85°F, place it in your 5-gallon plastic open fermenter.
 6. Now add the moto, or yeast mash, which has been fermenting for two weeks, and mix thoroughly *with your clean hands* for about 30 minutes. Cover the fermenter with a plastic sheet and keep the temperature around 70°F. Stir at 2-hour intervals for about 12-hours. (A stainless steel stirring spoon is OK for that).
 7. Stir at 12-hour intervals for a total of 48-hours time (from steaming). The second 24-hour period is called *odori*, or dancing, ferment. By now you have tripled the volume of the original *moto*.

II. Middle Addition (*Nakazoe*).

1. This takes place 48 hours after the first *hatsuzoe* addition.
2. Eighteen hours early, wash and soak 6-cups of rice (48-oz/1.36kg), and at that same time add 1½ cups—less 3-teaspoons—(11.25-oz/325gm) *koji* to the main ferment, and stir it in.
3. After soaking the rice 18 hours, steam it for 45-minutes, as described earlier.
4. Add the steamed rice to 8¾ cups (70-oz/2.1liter) of previously chilled water (40F/4.4C), mix by hand, and add the whole of it to the main ferment. Mix as before for about 30 minutes. Stir again after 12 hours, and keep the mash covered. By now you will have doubled the volume to about 2 gallons.

III. Final Addition (*Tomezoe*). 24 hours after last (middle) addition.

1. As usual, 18 hours early, soak the remaining rice (5 lbs). At the same time, add the rest of the *koji* (about 17.5 oz) to the *moromi* mash and mix it in.
2. At the proper time, steam the rice, and mix it with 144-oz/4.25liter (1 gallon plus 2 cups) chilled water as before. This will again double the mash volume, to a little over 4-gallons/15liters.

MAIN FERMENT (*Moromi*) PROPER

- I. *Moromi*—5th day on. Lower the temperature from 70°F/21°C down to 60°F/15.5°C or even as low as 50°F/10°C, which would be better. Keep it covered and cool, this should be a long slow ferment. IMPORTANT—keep it cool!
1. Stir at 12-hour intervals through the sixth day. Keep covered and at 50-60°F as described above.

2. It is wise to monitor the ferment and take a sample sometime between the 6th and 10th days to determine specific gravity with your hydrometer. Specific gravity will drop from 1.030 to 1.015, and continue. There is really no simple way of determining the "original gravity," and it should be of no concern.
3. By the 14-18th day or so, the ferment should be nearly over. Maintain the low temperature. Gravity should be 1.000 or lower; acid, if you check that, will be around 0.5- 0.6% as tartaric (winemaker's acid test kit). The alcohol will be about 13-15% by volume by that time. You should lower the temperature to 50°F/10°C if you have not already done that.
- IV. **Yodan.** Fourth addition—stabilizing and adjusting the alcohol and dextrin content, according to the type of sake you are making.

SWEETER OR LESS DRY SAKE

If the brewer wishes to make sake that is less dry than SMV +6 to +8 (sg 0.994-0.996), it is wise to save 1.5 to 2.5 cups of rice from the third addition, and add to the ferment (at *Yodan*) along with an equal amount of water (also saved from the third addition). This will have only a slight effect on the total alcohol, but will increase the dextrins in the sake, and prevent it from being quite so dry. The above will be in addition to the water amounts (see next) described to adjust the alcohol content at yodan (fourth addition). Any rice added must be washed, soaked and steamed in the usual fashion.

1. Somewhere around the 19-21st day—after nearly three weeks—the specific gravity of the mash should be down to 0.999 or lower. The lower the better. This last *yodan* addition tends to stabilize and adjust the alcohol content of the beer. It consists of adding 30- to 157-oz/0.9-4.6liter of *chilled* water, the amount of which will depend on the final desired alcohol content (these figures are approximations, an ebulliometer will determine the actual alcohol content (a friend in the local University's Chemistry Department does this for me):

If you add no water it should finish with an alcohol content of above 18.5% volume: *Genshu* sake.

30-oz will yield 16% alcohol. Ordinary sake.

68-oz will give 14% alcohol (weak, not recommended).

120-oz will give 12% alcohol for rice table wine, the usual strength of fruit sakes.

178-oz/5.25liter of water will yield 10-11% alcohol for making sparkling sake. Too much alcohol in sparkling sake will not allow a second bottle ferment, necessary to carbonate the sake, hence the 11% limit. At any rate, in 3 - 5 days more, the *moromi* or main ferment will be finished. Gravity will be around 0.990 to 0.997 or so, and the *jiu* is ready for racking, pressing, and secondary storage.

Japanese Style Sake

Additions of Materials

		Yeast Mash	First Addition	Middle Addition	Final Addition	Yodan*	Total
Steamed Rice	Ounces	12	20	48	80	----	160 (10 lb)
	Cups	1.5	2.5	6	10	----	20
	Grams	340	570	1360	2120	----	4400
Koji	Ounces	3.75	7.5	11.25	17.5 (balance)	----	40 (2 x 20-oz. box)
	Cups	7.5 Tb	1, less 1 t.	1.5 less 3 t.	ca. 2 (balance)	----	5
	Grams	106	210	320	498	----	1134
Water	Fl. Ounces	20	22	70	144	----	256 (2 gal)
	Cups	2.5	2.75	8.75	18	*	32
	cc/ml	620	690	2070	4259	----	8520

*Yodan varies with final alcohol strength desired. For 16%, add 30 oz.; for 14%, add 68 oz.; for 12%, add 120 oz.; for 11% champagne, add 157 oz.

ADDING WATER TO REDUCE ALCOHOL CONTENT

If you severely reduce the alcohol content to below 14% (which is what is happening here) be sure to save some of that water to use for topping-up (see secondary ferment—next). Be careful at this time, because once you add water and reduce the alcohol content you can never remove it to increase the alcohol content, and correct any errors you may have made.

SECONDARY FERMENT AND MATURATION

- 1a. If you made no additions at yodan (above) i.e. if you are making the strongest, driest sake you can, then you should rack the sake at that time.
- 1b. If you added water or rice or both at yodan, wait three to five days (after yodan) to rack to secondary ferment as described below.

In either case, the ferment will be complete, and the specific gravity around 0.990-7. The *jiu* is ready for racking, pressing, and secondary ferment, storage and aging.

2. Transfer the sake from the primary fermenter by siphoning the liquid through a plastic siphon hose from the open primary to sterilized closed fermenters such as four-liter or one-gallon wine jugs. If you are making a large enough batch, use an appropriate sized carboy in the 3- or 5-gallon size. There will be about 320-oz/9.5liters (more if you added water at the stabilizing addition) of liquid, that is about 2½ gallons. Fill the jugs to about the level of the shoulder (not full), which will take about three such containers. This is more than the water you added, but remember that the rice takes up an extra 25-35% of its weight from water when it is steamed. Press the

lees carefully to extract all possible fluid. A small wine press (found in winemaking supply stores) is fine for this. Put the sake lees in a cloth strainer bag, such as a nylon mesh bag, also available in winemaker supply stores. The extra liquid from the pressing should fill the three jugs, but if not, then you should "top" them up. This process of transferring the sake to closed containers is called **racking**.

TOPPING UP

"Topping up" is essential to the good health of your *jiu*. This means adding water to fill the jugs to the neck, so as to reduce air space. It is essential to protect your brew from oxygen at this time. The presence of oxygen will cause the sake to darken, and promote the production of acetaldehyde, a compound present in sherry, which gives it the special nut-like taste, but which can also ruin your *jiu*. The key to success in "topping up" is to find bottles or fermenters just the right size. Say the volume of your batch is two gallons plus another $\frac{2}{3}$ gallon, about normal for our basic recipe. This would fill two 4-liter bottles right into the neck (important), but there would be just under 2-liters of *jiu* left over. This would fit two 750ml's and a 375ml all topped up with sake, or if necessary, add water, or commercial sake, or your own sake from a past batch. Topping up is very important.

3. These topped-up containers and their sake should be placed under fermentation lock. Fermentation locks are small plastic fittings which hold water, and permit the escape of carbon dioxide without allowing the entry of oxygen, which can damage the sake. Inexpensive fermentation locks are

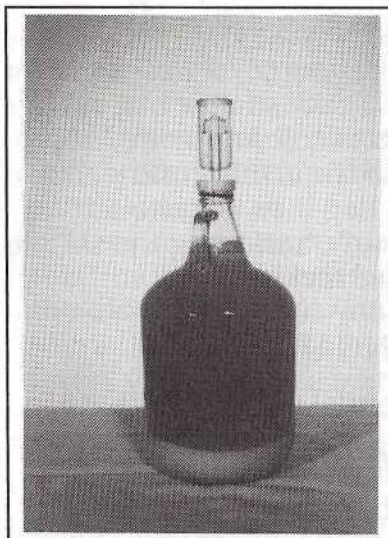


Fig. 9.6. Secondary ferment in a 4-liter wine jug. Note the attached plastic fermentati on lock contains water in its reservoir.

available for purchase at winemaking supply stores and you need one for each jug. Each fermentation lock should have water in it, and each should have a campden tablet crushed and dissolved in that water. Campden tablets are potassium sulfide and serve to keep unwanted bacteria out of your *jiu*.

Keep these containers under observation until you are certain there is no more ferment.

4. The end of ferment is signaled when there are no more bubbles in the fermentation locks. The storage temperature of the secondary fermenters should be around 50°F/10°C.
5. When there is no sign of any fermentation activity, the fermentation locks should be removed from the bottles. They should be capped, and then placed in the refrigerator at 40°F/4.5°C for about ten days.
6. After ten days, the sake should be racked again (to another set of sterilized wine jugs) and strained through about 4 layers of gauze to remove any re-

maining solids, and fine with Sparkolloid or Bentonite. Follow the manufacturers directions for using these agents. To fine is to clarify the brew. The *Sparkolloid* (better with smaller batches) or *Bentonite* react with colloidal suspension in the sake, and cause all particles to settle to the bottom of the jug. Allow another 10-21 days for the final clarification of the sake. By this time there will be a very fine sediment in the bottom of each jug.

7. When the *jiu* is clear, and well settled, rack again and be very careful not to siphon any sediment from the bottom of the old jugs to new, clean (and sterilized) jugs. Measure the specific gravity once more, it should be 0.990-0.999, and you might also measure the acid (optional, using a winemaker's acid titration kit) which will probably be 0.4-0.6% as tartaric. Lower is better. The alcohol will be 10-18% by volume (dependent upon how much water you added when you topped up the jugs when you first racked the sake from the primary fermenter). This will be dry sake, and that is considered best, but if you wish you can sweeten it a little by adding a half- to full cup of sugar syrup to the total batch, being careful to divide equally between the jugs.
8. The sake is next pasteurized. Pasteurization is necessary to inactivate the *koji* enzymes and disinfect the beverage. Pasteurization is really *very* important in making sake. Place the storage jug in a hot water bath, with a thermometer sticking in the neck. Heat the water until the thermometer shows 140°F/60°C, and remove the jug, cap it and allow to cool.
8. Store for 3-weeks to 2-months at 50-60°F.

BOTTLING AND FINISHING

1. In Japan, sake is bottled in distinctive 1.8-liter bottles (61-oz), but you can use champagne bottles (1.5-liter, 750ml, or 375ml) if you are a beermaker, because they can be crown capped. You can also use beer bottles. If you are a winemaker, you can use cork finish or screw cap wine bottles for your presentation. Sake is best bottled in brown bottles, and kept away from the light. Light really hurts sake, just as it hurts regular beer.
2. The sake should be pasteurized once again before closures are added, since the finished product is susceptible to certain lactic acid and bacterial infections. Winemaker's sulfur dioxide (campden tablets) is not recommended for use in sake, although apparently some commercial sake brewers do use it. Pasteurization should not effect the flavor negatively.
3. Sake is ready to drink at any time after it is bottled, but a modest aging period of about two months helps. Sake brewers disagree as to whether further aging is beneficial.

This recipe produces an authentic product, a little darker and possibly harsher, and a little more acidic than the commercial variety, and probably tasting more like old Japanese sake from out of the nineteenth century. Modern Japanese sake breweries produce a milder tasting product which is also lighter in color, because the rice is thoroughly polished. They remove color by filtering the sake through activated charcoal, which removes some of the flavor nuances. Our sake is really very good, and it can stand on its own merits.

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SAKE BREWING TIME TABLE

*Keeping a log and setting up a
task-oriented time table*

Although sake brewing is simple to do, it is based on a complex time table as to when to add to the moto, when to begin the soak, when to steam, etc. It is wise to set a list of tasks and post it in your brewery. It is also wise to keep a log and make notes about the sake as the brewing progresses from step to step.

The brewing process is not nearly as complicated as it looks on paper, but many steps (especially those early in the process) need to be planned ahead. I do this by setting a list of tasks on a sheet of paper, which I keep posted on my refrigerator. On this same packet, I keep a “log” or diary which shows what I have done, and what is happening, etc. Each addition of rice must be steeped 18 hours and steamed 45-minutes before being added to the mash, and then it needs to be stirred. When you set the rice to be steeped, the koji must be added, and while the rice is steaming you must chill the water to be added when the steaming is finished. Complicated? Not at all, but you do need a “list” naming dates, times, and hours to do these things. When they are done, you should enter them in your diary. Here’s an example of a recent brew of mine: (I took it off my refrigerator). This was when the moto was finished and I was ready to begin the moromi ferment.

SAKE NEXT TASK LIST

A chronological list of things to do.

Tues Nov 26 PM

1. Wash 2½ cups rice, and set that to stand in the refrigerator. (Needs to be done 18-hours before you plan the next step).
2. Add 1-cup (less 1-tspn) *koji* to the *moto* (which

has been resting for about five days at about 50°F).

Wed Nov 27 AM

1. Set 22-oz water with 1-t Morton Salt Substitute in the refrigerator to chill it to 40° F.
2. Put the steamer together on the stove, with at least a gallon of hot tap water, set the 2nd stage of the stamer with a dish towel or gauze layer to keep the rice from falling through the holes.
3. When the water is near boiling, place the second stage with the soaked rice on the steamer and cover with the lid, while it steams. Set timer for 45-minutes.
4. While steaming the rice, wash and sterilize (using 1-gallon water with a tablespoon of chlorine bleach) your 5-gallon plastic fermenter.
5. When the steaming has finished, add the steamed rice to the fermenter—break up the clumps of rice—and add the cold water you have prepared (item 1 above). Stir this together, and wait until the temperature has cooled to 85°F.
6. When the temperature of the above mixture reaches 85°F, add the moto. Wash your hands and arms and mix the moto, the freshly steamed rice, and the water together, by hand, for 30 minutes. Break up all clumps.
7. Cover the fermenter with a plastic sheet, set in a room where the temperature is about 70°F, stir at two hour intervals for 12-hours:

Wed Nov 27 AM plus 2-hours. Stir (use a stainless steel spoon).

Wed Nov 27 AM plus another two hours. Stir again.

Wed Nov 27 M plus another two hours. Stir again.

Wed Nov 27 M plus another two hours. Stir again.

Wed Nov 27 M plus another two hours. Stir again.

Wed Nov 27 M plus another two hours. Stir again.

I continue this task list for every step in the process, so I always know what is next and when to do it.

SAKE LOG

A chronological list of things done.

The following is a sample of a log of a recent ferment of mine.

BREW 901 (Ingredients as basic recipe, Montrachet yeast, procedures which are not described here are done as the recipe directs.)

Day -1 (1/30) Set rice to soak, set 20-oz water + yeast nutrient + 7.5 tablespoon Koji in fridge.

Day 1 (1/31) Set Moto after wash and steam as per recipe. Temp 77°F.

Day 3 (2/2) Taste slightly sweet, add yeast. Temp 57°F.

Day 4 (2/2) Fermenting, smells good, but has a slight acetaldehyde/nutty smell. Bubbling nicely to show good ferment

Day 6 (2/4) Still fermenting (by sound).

Day 8 (2/6) Still fermenting (by sound) smells good, tastes bitter and tart.

Day 12 (2/11) Set in Fridge at 45F until it cools, then move to coldest part of house (about 60F).

Day 14 (2/13) Wash 2½ cup rice set in fridge, add *koji* (for the *hatsuzoe* ferment) to the moto. *Moto* now tastes much better, but it is still very tart).

Day 15 (2/14) Soak the rice for *hatsuzoe*.

Day 16 (*moto*)/1st day (2/15) (ferment), Set 22-oz water in fridge, (add Morton Salt substitute), to cool and start steaming the rice for the *hatsuzoe*. Add cold water from the fridge to the fermenter, add the steamed rice to the cold water, and stir to mix the cold water with the hot rice.

(20 min later) Temperature now 86, *moto* is 67, mix the two together, stir by hand for a full 30-minutes.

(2-hours later) Stir with a spoon, volume is about ¾-gallon. Smells good and clean, mash is beginning to bubble. Cover with a plastic sheet to keep clean.

(2 hours later) Stir, good smelling stuff.

(2-hours later) Stir, and again 2 hours later. (2 hours later) Stir, tastes great, but a little bitter.

(2-hours later) Stir last time. Temp 73°F.

Day 2 (2/16) AM Stir. Odori (dancing ferment) room temp 70°F, mass temp 73°F, tastes a little bitter.

Noon: add *koji* for next addition to mash and stir, set 6-cups rice to soak (for *nakazoe*).

Day 3 (2/17) (AM) *Nakazoe*: set 70-oz water to chill in fridge. Steam the soaked rice for 45-min, add to water from fridge, temp 94°F.

(20-min later) Temp 84°F, add to fermenter, stir for 30-min by hand—completely break up all clumps. Tastes nice / smells delicious, temp 81°F room temp 71°F, est volume about 1½ to 2-gallons.

(Noon) Add the rest of the *koji* (for *tomozoe*) to the mash, stir with a metal spoon. Wash and soak the rest of the rice (5#), set in the fridge, for *tomozoe* (3rd addition).

(PM) Mash temp 76°F, room temp 71°F, this mass is generating heat

Day 4 (2/18) (AM) Set 144 oz water to chill in fridge.

Set the 10-lbs rice to steam 45-min., add to the chilled water, temp 94°F, (30-min later) Temp 92°F, add to ferment (a little warm, but I have other tasks to do, can't wait) stir by hand for 30-min being certain to breakup all clumps of rice in the fermenter. Volume about 3.5 gallons.(PM) Stir with a metal spoon, temp 74°F, room 70°F.

Day 5 (2/19) (AM) Moromi Ferment. Stir temp 73°F, room 70°F.

(PM) Stir, temp 73°F, move downstairs to cooler base-

ment area.Day 6 (2/20) (AM) Stir, temp 67°F, room 65°F. Move outdoors to cool it more (air temp 52°F)

(PM) Stir. Temp 55°F, air temp 50°F, move to garage (room temp 52°F)

- Day 7 (2/21) Leave it alone, in garage, weather stays fairly warm, so garage temp is about 50°F. Day 11 (2/25) Tastes good, tart but clean, temp 52°F.
- Day 14 (2/28) Weather turns cool (garage temp 45°F), bring ferment back to basement, room 62°F. Take sample for testing: Temp 16.3°C/61.3°F. Corrected specific gravity 0.9986 (SMV +2), acid 0.6% as tartaric (4.2ppt as succinic). Taste is crisp and clean, but a little acidic, compared to commercial sakes. Acid is normal for a home ferment.
- Day 18 (3/4) *Yodan*, add 12oz water 61°F sg 0.994 (SMV +9) tastes GOOD!
- Day 27 (3/13) Rack and press, temp 60°F, sg 0.994. The bottles are filled to shoulder level, not topped up, and we place fermentation locks on each bottle.
- Day 34 (3/20) Move to refrigerator at 45°F. This appears to be the end of ferment, there is no sign of activity in the fermentation locks. There is a light 2-inch of fluffy sediment in the bottom of each bottle. We remove the fermentation locks and cap the bottles and store in the fridge, to settle out more.
- Day 41 (3/27) This is our day to rack and top-up temp 48.2, sg 0.994, acid 0.375% as tartaric/2.65ppt as succinic, alcohol tests 19.1% by use of Ebulliometer. Est original gravity 1.120, but of course there can never have been an original gravity at any one point, this is calculated using the alcohol content and the terminal specific gravity. Taste is strong but good, a little more tart than commercial sakes. Rack and top up.
- Day 57 (4/12) Move to warm area to rack and fine using sparkolloid tablets (2 per gallon) volume 2-gallons in 4-liter bottles, which were topped up with water to total 8-liters. Temp 63.5°F/17.5°C. Pasteurize the sake in a water bath at 140°F/60°C. Cap the sake, place it in fridge to store, and sedi-

ment out a little more. (This should take 3-weeks to 2-months.)

Day 84 (5/9) Final bottling, bottle carefully by siphoning the sake off its very thin light sediment. Pasteurize again (in the bottle) and cap.

SAMPLE PROFILES OF THREE BATCHES:

<i>ABV%</i>	<i>SMV/s.g.</i>	<i>Acidity</i>	<i>color</i>
First Brew 1973-106:			
18.7	+9.5/0.9935	2.65/0.375	1.5
Montrachet yeast, tasted good clean and smooth.			
1973 brew: added sugar (4-oz/USgal), the profile then:			
18.7	-6/1.004	2.65/0.375	1.5
tasted good, I had sweeter taste buds in those days, because commercial sakes were also sweeter (1973 Sho Chiku Bai from Japan was also -6 SMV).			
Brew 201:			
19.1	+14/0.9901	3.5/0.5	2
Excellent but "strong."			
Brew 903 (at Yodan added +32-oz water/4-liter):			
13.6	+9/0.994	2.5/0.35	1.5
tasted OK, but insipid, a waste of good sake.			

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CHAPTER TEN

MAKING OTHER JIU VARIETIES

American sake brewers sometimes make what they call rice wine by using an enzyme from Miles Laboratories. This is an amylase enzyme, but it is not *koji*, it works somewhat differently than *koji*. The enzyme converts the starches in rice grains to fermentable sugars, the result may be made into rice syrup, and that may be purchased at many winemaking supply stores. The enzyme itself is available, and it is often sold under the name "*koji*." Again this is not *koji*. The enzyme is rust colored, and somewhat granular, it is not a mold culture, and there is no rice with it. Rice *koji* has already been described. The action of this enzyme is not a mold action, and there is no amino acid production, which is essential in making *jiu* and sake. When the enzyme is used on rice, the result is rice wine, and it is subject to the same limitations as wine, that is, there will be a limit of alcohol production, and little amino acid production.

FRUIT JIU WITH FRESH OR FROZEN FRUIT

For fruit sake, I would suggest you try 2.5- 6-lb (1.1 - 2.7kg) frozen fruit added when the specific gravity reaches 1.000, about the 10th or 12th day. Simply add the frozen fruit (break it up) and stir it into the mash. (My recommendations are based on good winemaking procedures, as I have no experience with fruit sakes). I would certainly appreciate any input on brewing this type of sake. If you use fresh or frozen fruit, it should

be added while the ferment goes on, perhaps at hatsuzoe (third addition) then add the extra water later on in the yodan addition. This method allows one to make dry fruit *jiu*.

SWEET FRUIT JIU

The Japanese make what is called plum wine by two methods, one is by using rice wine as a base, and the other using sake as base. Plum extract syrup is used.

Recently, I made my first venture into fruit *jiu*. I used my regular *genshu* sake, which had tested at 19.1% ABV. I added 3-ounces of defrosted frozen juice concentrate to each 12-oz bottle, and then I filled the bottle with 9-ounces of *genshu* sake. The finished product was quite pleasing. I made apple, white grape, and cranberry-raspberry sake. This is a very simple 3:1 reconstitution of the fruit juice, as per directions on the can, but with *genshu* sake instead of water. The result was a reduction of the alcohol content by 25% (to 14.3% ABV). These fruit *jius* make fine dessert, or aperitif, wines. The apple, white concord and cranberry-raspberry concentrates were selected because they have fairly strong flavor (to mask the tang of the *koji*), and because these concentrates are very cleanly filtered, as opposed to concord, orange or pineapple concentrates for example. Of the above three fruit *jius*, the cranberry-raspberry was the best (in my opinion).

SPARKLING JIU

Let me add here that I've not made sparkling sake either, but I have made sparkling wines, and the process should be quite similar. One should start by diluting the sake to a proper alcohol level, and then proceed in accordance with good winemaking procedures

for making sparkling wines. The second ferment in the bottle will raise the final alcohol for sparkling sake to about 12.5%. Any good wine making book will tell you how to make sparkling wine. Anderson's *The Art of Making Wine* at your local retailer will give all the information the reader may need, but I suggest rice syrup for the second ferment instead of sugar.

Honey flavored sake also sounds good to me, and herbal sakes from mint or some such would also be a great idea. There are a lot of possibilities here. The Japanese also make a sake aperitif which uses finished sake to stop the ferment, making a strong dessert *jiu* possible.

ASIAN HOMEBREW

Like the rest of us, the people of Asia do make homebrewed *jiu*. Here are two recipes from that background. They are a lot easier to make than our sake procedure outlined in the last chapter. Both could be improved by substituting some of the procedures outlined in that chapter for the more primitive methods described below. I have tried to suggest some of those modifications.

Chinese home brewed *Jiu Niong*

My Chinese sources failed to find a home-brewed recipe that Westerners could use, but we continue the effort, and will publish any results in the *Sake Connection*.

Korean home brewed *Makolee (Mak-joo)*

This brew uses an enzyme called *Nu Ruk*.

INGREDIENTS

6-lbs	Short grain rice	3kg
3-gallons	Water	12liters
16-oz	Nu Ruk	454gm
packet	Bread yeast (better yet use Red Star wine yeast)	packet

☞ Cook the rice in the usual fashion, using a rice cooker, or else steam it (better) after preparing it as described in the last chapter. Place it in a 3- 5-gallon primary fermenter (last chapter). Cool by adding the water to bring the temperature to 80°F/26°C. Stir the mixture with your clean hands to break up all clumps. Place the *Nu Ruk* in a closed cotton bag and put that into the rice-water mix. Add the yeast (sprinkle and then mix in), and ferment at 73-77°F/23-25°C. See the next recipe for directions on using bread yeast in this ferment. Ferment 5 days and serve it in bowls to be eaten as soup. *Makolee* has a musty, almost moldy, flavor and is a little tart. It tastes odd at first, but the flavor improves as you imbibe. Don't try to keep this, as it does not age well. The recipe can use up to 10-lbs/4.5kg of rice, add water at about half gallon/2-2.5-liter per pound/454gm of rice. Approach this beverage with caution.

Recipe from Mrs. John Davidshofer who is Korean.

Japanese Doburoku (Cloudy) Shu.

INGREDIENTS

5-cup (2.5-lb)	Short grain rice	1.1kg
3.75 qts (15cup)	Water	3.5liters
20-oz	Koji	454gm
packet	Bread yeast (better yet use Red Star wine yeast)	packet

Cook the rice in the usual fashion, using a rice cooker. Properly cooked short grain rice uses equal parts water and rice. The rice is cooked until the water evaporates. It is easier if you use a rice cooker, but it would be even better to steam it after preparing it as described in the last chapter. Meanwhile prepare the bread yeast as follows: put a dime sized dab of Fleishmann's Rapid Rise Yeast in a very small cup or bowl, add about half as much brown sugar, and about as much warm water. Mix them all together, produc-

ing about a half-teaspoon or so of the mixture. Keep in a warm place until it rises and becomes bubbly (about 20-minutes).

When the rice is finished cooking or steaming let it stand for 10-minutes, then ladle it into a 3- 5-gallon primary fermenter (last chapter EQUIPMENT). Cool by adding the water. Mix thoroughly with your clean hands to break up all clumps, add the *koji* and continue to mix by hand until the temperature reaches 80F/26C. Then add the bubbly yeast, and mix that in the same manner. Cover with a plastic cloth, and store in a cool dark place (65-70°F/18 -21°F) for about ten days, after which it is strained off the rice. Funnel into bottles which are not capped tightly (there may still be some ferment), and store in the refrigerator until used.

ALTERNATE PROCEDURES: Treat this as we described in the last chapter for the preparation of *Moto*. That took 14 days, and the yeast was not added until the day after the *koji* was added. Also the *koji* was set in the water WHEN THE RICE WAS WASHED AND SET TO STEEP in the refrigerator. Yeast was added (wine yeast is better, but you don't need regular sake yeast for this unless you want to be more elegant about it) by sprinkling (½ packet here) the yeast on the *koji* rice water mix, and allowing that to stand for a day before stirring it in. Another good idea is to stir it twice a day for a couple days and once a day for a couple more, before letting it stand to complete its ferment. One more idea you might try with this is to put the finished ferment in a one gallon wine bottle under a fermentation lock. Leave it there until there is no further sign of ferment (bubbles in the fermentation lock). The finished product is handled like *moromi* or *nigori* sake, that is the sediment is mixed up into the clear sake, and the whole is poured and enjoyed in that fashion. This product will take 15-20 days instead of ten as the recipe suggests.

The recipe is from Mrs. Chiba of San Diego, whose husband Kazuo Chiba is head of the teaching committee of the United States Aikido Federation, Western Region. Mr. Chiba is a *Shihan* (exemplary teacher), and 7th degree black belt Aikido. The recipe was obtained by Jeff Frane, who edited this book. I have suggested some changes to bring it into line with good *jiu* making procedures outlined in the last chapter.

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WHOLESALE SUPPLIES AND EQUIPMENT SOURCES (FOR RETAILERS ONLY)

WHOLESALE RICE

Kokuho Rose Extra Fancy brand may be had from Nomura & Co., 40 Broderick Rd, Burlingame CA 94010.

WHOLESALE KOJI

The only widely available brand is *Cold Mountain Rice Koji*, from Mutual Trading Co., 431 Crocker St., Los Angeles CA 90013, tel 213/626-9458, FAX 213/625-5130. *Koji* is shipped refrigerated, and must be kept refrigerated. The Canadian home brew supplier Spagnol's in New Westminster BC has found a local supplier of *koji* that may be ordered from them (Canada 1-800/663-0954). Please note that the basic recipe (last chapter) has to be adjusted for different sized amounts of *koji* (such as 1-lb units instead of the Cold Mountain 20-oz units).

WHOLESALE SAKE YEAST

Sake yeast (*saccharomyces Sake var Yabe*) is available from WyEast Labs (P.O.Box 425, Mt Hood OR 97041).

WHOLESALE ALUMINUM STEAMERS

The 45cm aluminum steamer *Mong Lee Shang* brand is available from Lieh Gee Enterprises, PO Box 2291, Taipei, Taiwan.

RETAIL SOURCES FOR KOJI AND SAKE YEAST are listed in each issue of the *Sake Connection*.

APPENDICES

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APPENDIX ONE— RATING 48 JIUS ON THE AMERICAN MARKET

For several years now, I have conducted, with friends, annual tastings of various sakes and *jius*. Normally, we tasted at room temperature, but we enjoyed most sake a little more when heated a bit. During that time only one sake, an American *dai-ginjo*, received my 5-dot rating (world class), but unfortunately it is no longer made. Until this year, the *ginjos* were rarely found in this country. However, I recently tasted *Ozeki Ginjo Premier*, and the new *Hakusan Premium Sake*, I gave them 94 and 91 points respectively (100 max). The Hakusan had won double gold in the California State Fair, America's first commercial sake judging, while the Ozeki had not been entered. I also found the *Pagoda brand Supreme Shao Hsing Hua Tiao Chiew* (dry) also worthy of this level (93 points), and (surprise) it cost only \$3.29 (750ml) at a Chinese supermarket in the Los Angeles suburb of Monterey Park.

The following ratings are from my own tastings, and do not reflect those of any group. My preference is for extra dry (Japanese: *chokarakuchi*) sake, and I tend to denigrate anything sweeter than that, although I do try to be fair and include less than dry types in my ratings.

An asterisk (*) before the name indicates a *Jizake* (country sake) from a small sake brewery.

Dry-sweet ratings are from the Japanese system, based on the specific gravity/SMV of the chiu.

ed: extra dry	SMV +12 to 15
vd: very dry	SMV +6 to 11
d: dry	SMV +1 to 5
md: medium dry	SMV +1 to -1
m: mild	SMV -1 to -2
ms: medium sweet	SMV -3 to -5
s: sweet	SMV -6 to -10
vs: very sweet	SMV over -11.

There are very few sweet or medium sweet sakes to be found in the American marketplace.

SUPERIOR JIU (80-90 points)

California Ki-Ippon Nigori (US-CA) d (unfiltered, unpressed, unpasteurized) 82

California Ki-Ippon Premium Dry (US-CA) d (this is a genshu, or undiluted (and unpasteurized) sake 84

***Harushika Chookarakuchi (Japan)** ed 86

***Mineno Hakubai (Japan)** vd 83

***Otokoyama (Japan)** vd 85

Nan I Lake Te Jia Fan (China), this is a delicious Chinese sherry-like version of sake, a variation of Shao Xing wine (semi-dry) 85

Pagoda Shao Xing Rice Wine (China) s, similar to above, but a little sweeter than Jia Fan. The above two are semi-dry, but the taste effect is that of dryness. (Available in 180ml bottles) 89

Sawanotsuru Genshu, (Japan) d, this is really an impressive sake, also available in 120ml bottles for sampling. Genshu is undiluted sake, at 18% alcohol 89

Sho Chiku Bai Go Kai Sake Dry (US-CA) d 83

FINE SAKE (70-79 points)

- *Aramasa (Japan) d 77
- California Ki-Ippon Dry (US-CA) d 72
- Gekkeikan Original Sake (US-CA) d 79
- Hakusan Sake (US-CA) d 70
- Hakusan Sweet Blossom (US-CA) vs, dessert sake 77
- *Hiraizumi (Japan) d 78
- *Hitori Musume (Japan) md 79
- Kamitaka Sake (Japan) md 74
- Kiku Masamune (Japan) d 75
- *Koshino Shirataki (Japan) vd 77
- *Masumi (Japan) d 79
- *Nanawarai (Japan) d 77
- *Oyama (Japan) d 79
- Ozeki Sake (US-CA) md 75
- Pagoda Chia Fan Rice Wine (China) semi-dry 79
- Sawanotsuru (Japan) m 72
- Sho Chiku Bai (US-CA) m 79
- Sho Chiku Bai Nigori (unfiltered, unpressed, unpasteurized) d 73
- *Shunnoten (Japan) d 79*
- Shutendhoji name means Sake Devil (Japan) d 75
- *Suishin (Japan) md 70
- Taiho (US-CA) d (bulk version of Cal Ki-Ippon above)
70

GOOD SAKE (60-69 points)

- *Bandai (Japan) md 69
- *Bishonen (Japan) ms 64
- Gekkeikan Draft (US-Japan) 64
- Hakusan Mild (US-CA) d 63
- Hakutsuru Sake (Japan) d 67
- Ichidai Sake (Japan) md 69
- *Koyuki (Japan) m 67
- *Nishino Seki (Japan) m 68
- Takara Masamune Hawaiian Sake (US-HI) m 68
- *Tsukasa Botan (Japan) md 65

**ORDINARY, VERY ORDINARY, AND
EXCESSIVELY ORDINARY (59 or less)**

Chiyoda (Japan, made especially for shipment to U.S.)

59

Shirayuki (Japan) 40

Sho Chiku Bai Nama Sake (US-CA) 59

Shao Hsing Wine (Taiwan, 14% alcohol), is almost
undrinkable alongside mainland Chinese Shao
Xings. 35

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APPENDIX TWO— 1992 SAKE CATEGORIES FOR AHA JUDGING

*(reprinted with permission from the American
Homebrewers Association)*

1. SAKE, or Japanese Rice Beer.

Twelve to twenty percent alcohol by volume. Can be semi-dry to dry to very dry. Pale yellow color to almost water clarity. Must be made with rice koji, rice and yeast only.

Subcategories:

a) Genshu sake—full strength 18-20% alcohol

b) Ordinary sake—16-17%

c) Nigori (unfiltered—unpasteurized) sake, will have a cloudy sediment (often in suspension).

d) Ginjo sake, from highly polished rice, unlikely to be available to home sake brewers. Crystal clear and very pale, almost no color at all.

e) Brown Rice (Genmai) sake. As above, but made with unpolished rice, and rice koji.

f) Rice wine or low alcohol sake (12-13% alcohol), and fruit or herbal sake (12-16% alcohol).*

2. Sparkling Sake.

This is about 12.5% alcohol by volume, and is regular sake which has been made to about 11% alcohol, and then refermented in the bottle ala Champagne (*Methode Champagne*), using rice syrup and yeast for the *dosage* to start the second ferment in the bottle, followed by standard disgorgement as in finishing sparkling wine. Sparkling sake can be made from fruit or herbal sake.

*In 1993 we will recommend this category be moved to Section 3.

3. Other Oriental rice beers (*jiu*). Includes any indigenous brews and Asian homebrew, such as Korean *Makolee*, Japanese *Doburoku*, and the Chinese variations of homebrew. This category also includes Chinese Amber Rice *Chiu* (*Shao Xing Huang-Chiu*), similar to Japanese Sake, but with crushed wheat and polished and brown rice. The end product is sherrified (aged warm, and oxidized), and in some cases wheat *koji* is used. This category also includes *jiu* variations from other grains: these may be corn, wheat, barley, or millet. Grains other than rice and millet need to be coarsely crushed, and then separated from the flour. We need to experiment some here. 14-18% alcohol.

These categories are not meant to exclude any product made from rice, but if it is labeled sake, it must use *koji*. You can't ferment rice syrup with yeast and get the proper flavor. *Koji* is a "must".

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APPENDIX THREE— JUDGING AND EVALUATING SAKE

Compiled by Fred Eckhardt and J.Itsuo Takita.

We need to start this judging business somewhere, and I hope that this appendix will be a start, a beginning. Sake/*jiu* is no different than wine or beer, if you can tell what you like, and determine what you don't like, you are in good company, and you'll make a great sake judge, experience notwithstanding. The following scoring system is based on that used by the American Homebrewers Association for judging mead, another alcohol beverage for which there were no qualified American judges before they began judging that category at the AHA in 1978.

Kondo⁽²⁾ tells us that the Japanese have been critically judging their sakes since the Ashikaga shogunate 14th and 15th Century, and he adds: "Anyone familiar with wine, whiskey, or beer tasting will have a substantial head start in approaching sake."

We feel that the flavor of *jiu*/sake as well as beer/wine is a combination of sweet, bitter and sour tastes with the olfactory stimulus of odors, **plus** the tactile sensation of the sake touching the various parts of the mouth.

Sake or *jiu* drinkers, like beer drinkers, probably couldn't identify the endearing qualities of their favorite brand, but they can nearly always find what they don't like about a given beer or *jiu*. This is a beginning in the process of critical evaluation.

EVALUATION AND SCORING

There are many ways to evaluate beer, wine or sake. We are more interested in quality judgment, where the *jiu* or sake is judged on certain qualities with regard to its comparative ranking and value in the way that wine and beer are judged. There are many ways to score such judgments and evaluations to make them meaningful, but two are more important. We can score by evaluating the sake on a point basis, as in beer and wine judging, using a 20- or 50-point system (such as that used here for the American Homebrewers Association). Alternately we can judge on a plus-minus, like-dislike basis (e.g. +5 to -5). This would create what is called a *flavor profile*.

Much of the literature on sensory evaluation^(83, 85, 87) stresses the importance of the pre-tasting examination. We fully agree. Sight and smell are of critical importance to the evaluation of any beverage, but especially to that of *jiu*/sake. Accordingly this procedure is weighted to give 30% of the score to sight and smell.

THE FIFTY POINT SCALE

The 50-point scale has been adopted by the major homebrew judging groups (American Homebrewers Association—AHA—and the HWBTA—Home Wine and Beer Trade Association) and that is the scoring system described here⁽⁸⁸⁾.

This rating system is divided into four departments: 1 & 2) *before tasting* (sight and smell), 3), *in the mouth* (taste, touch and olfactory), and 4), *post tasting* (summation). We have weighted these departments at 10/50, 5/50, 25/50, and 10/50.

PROCEDURE FOR TASTING USING THE 50-POINT SCORE SHEET

The score sheet is divided into four segments: appearance; odor; taste and in-mouth feel; and general impression. These are each judged separately and the results are added for the total score of that *jiu*.

1. APPEARANCE—PRE-TASTING VISUAL EXAMINATION.

- a. Examine the bottle for sediment; there should be absolutely none. Sediment in any *jiu*/sake is a (except as noted below, where it is required) major flaw, and probably indicates old (too old) sake. An exception to this might be an aged Chinese style *Huang Jiu*, or possible an old *koshu* or *kizoshu* style of aged sake. Commercial sake must be completely non-sedimentary and brilliant. According to Koizumi⁽⁴⁹⁾, the Japanese use about 20 words to describe the appearance of sake⁽⁴⁹⁾. These describe the *jiu*'s clarity, luster, and depth of color. Kondo⁽²⁾ is very helpful here. Clarity *sae* or *teri* is noted first: check for cloudiness, a definite flaw. Let me repeat, clarity is a major element here. Color may range from nearly colorless to slight yellow tinged with green to a light yellow tint. Homemade sake from normal polished cooking rice show 1.5 to 2 times the color of a standard solution of 2-liters of water with one drop of yellow food dye added. Commercial sakes range from 0.15 to 0.6 of that standard. This light yellow color is called *yamabuki* the color of a Japanese rose.

NOTE: The third category—Other Oriental Rice Beers—include *jius* that are expected to be totally cloudy, and if they are not served that way you must shake the sediment back into suspension.

Thus clarity is a no-no in this case. This is true of *moromi* and *nigori* sake as well.

- b. **Pour the *jiu*/sake.** Pour 3- 4-oz (90-120ml) of the *jiu* into the glass. Do not fill the glass more than about 2/3 full. Leave at least a fourth of the glass' volume empty. The sedimented old *jiu*'s or sakes described earlier may need to be decanted carefully, so as to avoid disturbing the sediment. On the other hand farm-style sake homebrew, other primitive Asian *jius*, *nigori* and *moromi* sakes, are all expected to have their sediment INCLUDED in the taste. The glass should include sediment and swirled regularly to incorporate that into the drink at all levels of the tasting including evaluation. Chew some of it in your mouth.

Note: the aroma and bouquet are released most effectively during the period immediately after pouring the *jiu*.

- c. **Quickly sniff the *jiu*/sake.** Volatile aromatics may not linger, and must be caught right after the *jiu* is poured (see no. 2 below). Take 2-3 quick whiffs, swirl, and take several more short sniffs.
- d. **Examine the *jiu* in the glass.** For a short period, examine it for color, clarity, and gas release (if a sparkling *jiu*). The color should be correct for the *jiu* type.

Gas release—sparkling *jiu* only, the bubbles should be *small*, compact, and continue to be released during the visual and olfactory examination. If the room is quiet enough, you might put your ear to the glass and listen for the sound, which should be a steady buzz, like that expected of fine champagne. We might not expect artificially carbonated *jiu*, but if tasted it

would probably exhibit fat bubbles in the gas release.

TOTAL AWARD—APPEARANCE: Maximum 5 points.
Ordinary sound *jiu* 3.

2. **ODOR—PRE-TASTING OLFACTORY EXAMINATION**

Note: This is done in conjunction with the visual examination of the *jiu* in the glass. See note earlier about aromatics immediately after the *jiu*/sake has been poured.

Sniff the *jiu* again—take a good strong sniff, paying special attention to the bouquet, noting especially any off-odors that may be present:

Aroma—strictly speaking, there is relatively little aroma in sake/*jiu*, since that is defined as the character of the raw materials of the *jiu*, unaffected by the ferment. The only raw material in most *jiu* is rice, which leaves very little identifiable taste or aromatic elements. Of course, a fruit or herbal *jiu* would have aromatic and taste elements from those added ingredients.

Bouquet—this comes from the odors of the fermented elements of the *jiu*/sake, and there is plenty of that.

Koji nose—this is the bouquet of the *jiu*, as it is affected by the action of the koji producing isoamyl acetate, and *n*-valeric acid ethyl ester. Note however, that some *jiu* may have very little noticeable koji character. The **koji nose** of a *jiu* might be intense, impressive, pronounced, noticeable, mild, or lacking. Score (+) or (-) in accordance with the *jiu*-type. There should be no noticeable off-odors either. If any negative odors are detected, such as medicinal, oxidized, musty,

acetic, yeasty, sulfide, sour or infected, (see glossary for definitions), score (-) or 0—unacceptable. Other more pleasing side-odors might include fruity or nutty, and some fermenting odors. If you feel these latter side-odors contribute to the *jiu*, do not deduct, but if they do not contribute, deduct (-1, -1½).

The Japanese use about 90 different words to describe the aroma of sake⁽²⁾. These describe its “basic character, strength and idiosyncrasies.” Swirl, and then sniff the aroma as it wafts off the sake’s surface, then put your nose in the glass and sniff deeply to get the deeper aspects, sniff repeatedly to gather the impression of the *jiu*. “New sake nose, *koji* nose, young nose, old sake “stink” for sake that has been aged too long,” etc.

TOTAL AWARD—AROMA AND BOUQUET: maximum 10, ordinary sound *jiu* 5.

3. **TASTE IN THE MOUTH**After you have completed the above, you may taste-sample the *jiu*.

TASTING PROCEDURE

Take a good sip (about 1-tablespoon, 15ml) of the *jiu*/sake. Swirl and slosh it around your mouth. Finish off the initial taste by opening your mouth a little and inhaling a bit of air (wine tasters call this “swizzling”) to aerate the *jiu* and excite the olfactory region at the base of your nose. It is the combination of olfactory, taste, and tactile examination that gives us the impression of “flavors.” Kondo⁽²⁾ suggests taking some in the mouth and then closing the mouth to “bite” the sake. Make sure the sake has reached all the corners and areas of the mouth and tongue.

Take a smaller sip to record the basic taste areas of your tongue: the sweet, salt, sour, and bitter areas. Try to keep them separate so as to identify any of these

tastes in that order.

Take another small sip for mouth-feel; pass some of the *jiu* along the inside of your lower lip (to check astringency, but which should not cause your inside lip to swell). As you can see, this both a taste and tactile (touch) procedure, and as the sake warms in your mouth, it becomes olfactory as well.

It will be necessary to swirl the glass, from time to time, to rejuvenate the release of aromatic elements. Finally, take another small sip, and evaluate the aftertaste, or tail. Japanese sake judges traditionally do not swallow sake, other than perhaps a tiny drop, wine judges seem divided on this, some swallow, some do not. Beer judges nearly always swallow the beer they have tasted. You must decide for yourself about this matter. Taste again, and again, as necessary, and in the same manner, to evaluate the total taste-in-the-mouth. The Japanese use another 70 words to describe the taste of sake⁽⁴⁹⁾, they do this (supposedly) without ever swallowing any of it! In any case it is certain that a judge does not need to swallow very much to judge sake. Swallow enough to find how it goes down, and to evaluate the aftertaste, which is important in any alcoholic beverage. Some Japanese terms describe a "rounded" taste, a "harmonious" taste, "worldly" and "gentle on the tongue" and "it slips down well" are also used to describe the in the mouth taste and feel. The tasting room should be provided with whatever number of receptacles are necessary for judges to spit the sake without embarrassment.

After all that, you should clear your mouth with a sip of water, perhaps accompanied by bread, cracker, or pretzel.

This is one unit, score 0-25. The award is arrived at without breaking down the elements of the *jiu*. Score the in-mouth *jiu* as a whole, balanced, unit. The

key to success in tasting is experience. You should be able to project an image of the “classic” profile of that *jiu* style in your mind, then compare that with what you are judging. This profile should consider the following seven areas. Do not consider odor or appearance, as these have already been evaluated separately (above). Your evaluation should consider the following elements.

Koji quality—mostly from the amino acids, there should be a good taste, smell, and aftertaste: pronounced, moderate or lacking, as expected of the *jiu* type.

Koji intensity—should be correct for the *jiu* type.

Sweet/dry balance—is the sweet/dry (non-sweet) balance correct for the *jiu*. Tartness (see next) is sometimes mistaken for dryness.

Jiu character—this is the sum of non-sweet/dry characteristics of the beer. The tastes and flavor profile should be correct for type. Tart or non-tart rather than sourness from intense acidity, although there are *jius* (Korean and some southeast Asian varieties) that do exhibit a lactic tartness. A tart *jiu* might be lactic, while a sour *jiu* might be acetic or vinegary. An acetic or vinegary taste in any alcohol beverage can never be acceptable, and must always be rejected. Noticeable tannic bitterness or astringency would be negative, and even *koji* bitterness, where harshly noticeable, is negative.

Aftertaste or tail—swallow a little of the very first tasting of the *jiu* to evaluate the aftertaste or tail. Some *koji* character might linger, along with other characteristics. The normal lingering taste should be pleasant and disappear fairly soon. This might be classified as pleasant (+), disappears rapidly or lingers not unpleasantly (+) or (-) depending on balance. Harsh or rough and clinging tastes (-). Off-tastes might include lingering tartness, astringency, mustiness, ace-

tic, or others, such as clinging bitterness from herbs or special ingredients, and these would always be negative, perhaps even unacceptable.

Body and Palatefullness—body is the alcohol character and richness of the *jiu*/sake. Palatefullness is the “feel” of the sake in the mouth, dependent on the fullness, neutral alcohol qualities, and the structure of the beer. **Body and palatefullness** may be dry, vinous, neutral, sweet, bland, full-bodied, thin, smooth, rough, watery, and correct or not correct for *jiu* type. The body is described in Japanese literature in some interesting ways, and the English translations are self-explanatory: to have meat—to have range—to have a swell; these to describe heavy *jius*, and others to describe a lack of these characteristics. Then there some terms which are negative: “garrulous, cloying, thick, unworldly, rough, and ill-bred.”

Flavor balance—How is the *jiu* “supposed” to taste, compared with how it *does* taste—is it correct for type. Flavors and off-flavors may include spicy, astringent, yeasty, sulfide, medicinal, oxidized, light struck, metallic, sour, bitter, salty, etc. Good or bad may influence your award here. This is the balanced taste and aftertaste of the *jiu*.

TOTAL AWARD—TASTE IN THE MOUTH: maximum 25, <10 is problem *jiu*, 10 - 12 drinkable, but perhaps out of character, 13-15, Ok but requires attention, 15-20, very good, but still needs some attention, 20-25, Excellent, requires little or no attention.

4. GENERAL QUALITY.

This is the combined response. Not to be used to adjust the score of the *jiu*, but rather as a separate and distinct factor. According to Amerine and Roessler ⁽⁸³⁾ “It is the memorableness of the character of the (*jiu*/sake), or its lasting come-

hither appeal." *Score*: Impressive 10, excellent 8, very good 6, good 5, drinkable 4, lacking 3, problem 2. Ordinary sound *jiu* 5 or 6.

TOTAL SCORE OF THE BEER; Your own dislike of a particular *jiu*-type should not be used as grounds to downgrade the *jiu*.

RATINGS—TOTAL SCORE:40-50 Excellent: Exceptionally exemplifies style, requires little or no attention; 30-39 Very good: Exemplifies style well, requires some attention;

25-29 Good: Exemplifies style satisfactorily, but requires attention;

20-24 Drinkable: Does not exemplify style, requires attention;

<20 Problem: Problematic, requires much attention.

VOCABULARY OF TASTE DESCRIPTORS

Brilliant—a state of total clarity, expected of all sakes and *jius*, except those *jius* brewed as Asian homebrews, or *moromi* or *nigori* sakes. These latter must be totally cloudy, i.e., should be shaken before pouring.

Fruity—having the character of fruit, sometimes positive, sometimes negative, as in *estery*. Positive when associated with aromatic freshness.

Herbal—having an herbaceous character from herbs used in its makeup which might, or might not, be negative, but would be required in some *jius*, e.g. a "dill" *jiu* would need a "dill" character, a garlic *jiu* would be expected to have some "garlic" taste, but neither should overwhelm. Of course, a non-herbal *jiu* should have NO herbal character, and if it were detected, that would be a negative. See also *spicy*.

Koji nose—the bouquet of the *jiu*, as it is affected by the action of the *koji* (isoamyl acetate).

Nutty—the mild and pleasant sherry odor which may or may not be desirable in *jiu* (depending on intensity and *jiu* type), but which would be neutral at best and negative at worst. May also be described as walnut, coconut, bean soupy, and almond as in marzipan.

Palatefullness—is the “feel” of the *jiu* in the mouth, dependent on the fullness, neutral alcohol qualities, and the structure of the *jiu*. Body and palatefullness may be dry, neutral, sweet, bland, vinous, full-bodied, thin, smooth, rough, watery, and correct or not correct for the *jiu*-type.

Sediment—an absolute must in some Asian style homebrews and in *moromi* and *nigori* sake. In judging these it is usually necessary to shake the bottle to re-incorporate the sediment back into the beverage before pouring and judging. Such sediment should not settle too soon.

Spicy—an especially distinct spice aroma which would come from the use of spices in the *jiu*. Such spices might include coriander, ginger, cinnamon, nutmeg, allspice, hops, pepper, and other spices found in some herbal sakes and *jius*. Needless to say, if the aroma (or taste) is harshly spicy it is probably undesirable (see also herbal).

Sweet—positive when expected but negative sometimes, as when it becomes too noticeable or when it is cloying or oversweet or doesn't belong.

Tart—clean acidity, as in lactic acid, a rather pleasant tartness, not to be confused with dry or sour or acetic, quite often (but not always) negative when more than very slightly noticeable in Asian style *jius*, and definitely negative in sakes of any kind. May be (-) or (+).

Vinous—a fusel or wine-like character, neutral at best, sometimes negative.

VOCABULARY OF NEGATIVE TASTE DESCRIPTORS

(Please read carefully)

NOTE: These characteristics are rarely found in commercial sakes and *jiu*, but might be found in commercial sake or home made sake, and sake/*jiu* stored or packaged under defective circumstances. This is by no means a complete list of negative factors, but rather a few of those more likely to be encountered.

Acetaldehyde—a natural fermentation by-product which is beneficial in very small quantities (6-8ppm). It is also a product of heat and oxidation (as in *Shao Xing jiu* or sherry wine). In larger amounts it is quite deleterious: If it is noticeable it is unacceptable. Acedaldehyde shows up sooner in the blood of those who may be susceptible to alcohol abuse.

Acetic—vinegary, totally unacceptable in any alcoholic beverage.

Astringent—often perceived as a mouth-feel rather than a flavor ("mouth puckering"), and is usually the result of excessive tannin in the *jiu*. This is very unlikely in sake or *jiu*, and definitely negative if and when found.

Characterless—bland, empty, flavorless. See also watery.

Clear—as opposed to **brilliant**. Definitely negative, but only slightly so. The character of having a very few suspended particles—possibly to an extremely faint, almost non-existent, haze. Nevertheless, a step down from **brilliant**. Sake and *jiu* should always be **Brilliant** or totally cloudy, never in-between.

Cloudy—having a cloud of rice haze or matter in suspension. A must for nigori or moromi sake, and for most Asian Homebrew styles.

Cooked Vegetables—as in cooked cabbage, corn

or broccoli, from sulfur compounds in the *jiu*—definite defect when found.

Dull—definite colloidal or rice haze—unacceptable (see. **cloudy and brilliant**) in any *jiu*. Jius are either cloudy and sedimented, or brilliant, but not in-between—ever.

Estery—Ethyl acetate, solvent-like, isoamyl acetate or banana-like. Ethyl hexanate or apple/anise-like. Negative if noticeable. Not to be confused with **Koji** character (isoamyl acetate).

Flat—lacking in carbonation, negative in sparkling *jius*, a must in ordinary *jius* and sakes.

Moldy, musty—expected in Korean **Makolee**, and some other Asian homebrewed *jiu*.

Watery—thin, lacking in body or character.

HOME BREW JUDGING

If the reader wishes to become a judge in homebrewed sake/*jiu* competitions, he or she should contact the home beer supplier nearest them (yellow pages) for the name of a local homebrew club, or write either of the following national organizations that sponsor training of homebrew judges. Write:

American Homebrewers Association

P.O. Box 1679 Boulder CO 80306-1679

and/or

Home Wine and Beer Trade Association

604 N Miller Rd Valrico FL 33594

酒

APPENDIX FOUR— GLOSSARY

In this glossary, if the word is of Asian origin, and not identified as Chinese or Korean, it is Japanese. It is well to remember that the Chinese, Korean, and Japanese languages have nothing at all in common, except that all three use writing based on the Chinese Han characters, the languages are not at all related to each other. It is also well to remember that, although Chinese has one written language form, it has many dialects, and sometimes different pronunciations within those dialects, and I have noted some words that have different pronunciations and spellings in English. A good example of this is the word *jiu*, which is also spelled (but not pronounced) *chiu* and *chiew*. It isn't even pronounced *jiu*, but rather something like *jyo*. Never mind, cease from fretting, relax and sip some sake (chilled or at room temperature, please). The *kanji*, or Japanese (Chinese) characters are all rendered according to Nelson, Andrew, *The Modern Reader's Japanese-English Character Dictionary*, Second Revised Edition, 1962 Tokyo, Japan: Charles E. Tuttle Co., Inc. In the case of the Chinese vocabulary, the characters have been rendered (where possible) from a Chinese dictionary the *Heian International Chinese-English Dictionary*, 1989 Union City CA. When we were unable to find it there the final rendering was from Nelson, when that was possible, otherwise it was from friends and publications in Chinese. The Korean characters were assembled with the help of friends.

酒

Sake (USA)

ABV.

Alcohol percent by volume.

Acidity.

This is the acid balance of the *jiu*, measured against a standard of parts per thousand as succinic acid in Japan, and percent as tartaric acid in the U.S. wine industry.

Amakuchi. (甘口)

Sweet sake, (SMV -5 to -10, s.g. 1.003 to 1.007).

Amazake. (甘酒)

A drink made from sake lees. Water and ginger are added and the drink is served hot. It has very little alcohol, and if made from only *koji* and rice, there will be no alcohol. In the latter, the *koji* converts the starches in rice to sugar, providing the basis for a sweet drink or pudding.

Amber jiu.

Chinese amber (or yellow) *jiu*, see *Huang jiu*.

Asian Homebrew.

Primitive style *jiu* made at home in China, Korea, and Japan, these are rarely refined, but remain cloudy, and often they are thick enough to be "eaten", rather than drunk. These include Japanese *Doburoku*, Chinese *Jiu Niong*, Korean *Makolee* or *Mak-joo*. They range in taste from sweet to downright sour, and from clean to musty tasting.

Aspergillus oryzae.

A mold culture used to convert starch in rice to fermentable sugar. It is used to make *koji* for sake production.

Bing, beng, men (jiu bing), (sometimes ping) see *jiu men*.

Chiu (also Chiew), see *Jiu*.

Chôkarakuchi. (超辛口)

Very dry sake, "extra dry", (SMV +12 to +15, s.g. 0.992 to 0.989).

Choko (ちょこ)

Small sake cup, see also *kiki-zake-choko*, and also *Sakazuki*.

Doburoku.

Japanese homebrewed *jiu*. See Asian Homebrew.

Fermentation Lock.

This is a plastic fitting, which fits on the closed secondary bottle fermenter. The fermentation lock has water in its vessel, and acts as a low pressure gas release valve to allow CO₂ to escape and prevent oxygen from entering the fermenter.

Fushimi. (伏見)

A major sake brewing center near Kyoto.

Genshu. (元酒)

Undiluted sake at full strength (18.5-20% ABV)

Ginjo, also *kinjo*. (吟醸)

Sake brewed from highly polished rice (i.e. rice polished to at least 50%).

Hashi-gozake.

A sake pub crawl, lit. "sake bridge."

Hatsuzoe. (醸添え)

First addition of rice, *koji*, and water to the *moromi* or main ferment.

Heisei. (平成)

Current era as a date on labels. Heisei 1 is 1989, heisei 2, 1990, etc. Date will be day, month and year. Rarely, the label date will be in Sino-Japanese characters, but Arabic numbers are more likely.

Hi-ire. (火入れ)

Pasteurization: heating to destroy bacteria. Pasteurization was invented in China by 1100, but possibly as early as the time of Christ.

Hua Diao Jiu. (花雕酒)

Chinese *Jiu*, an amber *jiu* from Shao Xing, literally "flower carving *jiu*," or bridal *jiu*, finished in elegant

jars and aged 5-years or longer.

Hsiang Hsueh Jiu. (香雪酒)

A Chinese amber *jiu* from Shao Xing, strong in alcohol and very sweet (20% sugar).

Huang jiu also *huang chiu.* (黃酒)

Yellow (amber) *jiu*, a generic title for many aged Chinese wines, including Shao Xing *jiu* (see).

Hyôtaru. (俵樽)

A sake cask, often made of cypress, but sometimes of cedar, and wrapped in straw.

Ichî-gô. (一合)

A small volumetric measure of rice or sake, One *gô* is about 6.1-oz, 180ml, a single serving in most cases, see also *masu*.

Ikkyu.

First Class Sake (Japanese Govt) (no longer used).

Izakaya. (居酒屋)

Small sake shop or bar, literally "sit-down" sake shop.

Japonica.

The rice variety used for making sake (*Oryza sativa Japonica/Sinica*).

Jiafan Jiu. (加飯酒)

Chinese *jiu*, an amber *jiu* Shao Xing.

Jiaojun. (酵菌)

Chinese *koji*, see *jiu niang*, for a better description of this product.

Jiu. (酒)

Generic title for all rice beers. These are not correctly beer, but they are made from cereal grains, nor are they wine, however the process is very similar to that of winemaking, and the final alcohol strength is at wine level or stronger. The use of the words beer or wine to describe this class of beverages is confusing. *Jiu*, from the Chinese, is a better word to describe them in English. My goal, in this text, is nothing less than to enter

this word into the English language.

Jiu cai. (酒菜)

Food for Chinese *jiu*, usually vegetarian snacks.

Jiu chang. (酒厂)

Chinese brewery, winery, distillery, or *jiu* brewery.

Jiu dian. (酒店)

Chinese wineshop or public house.

Jiu men. (酒餅)

Chinese yeast balls with the three types of fungi described next, plus a binder, which is rice and wheat flour and vegetable juice, alternately *jiu ben*, *jiu bing*.

Jiu-niang. (酒釀)

Chinese *koji*, with three types of fungi: *saccharomyces* type yeast, *lactobacillus*, and an *aspergillus* type mold.

Jizake. (地酒)

Country sake from a small Japanese sake brewery.

Joo. (주)

Korean *jiu*.

Joo jeom. (주점)

Korean wine/spirits shop.

Jummai-shu. (純米酒)

Sake made from rice only, no alcohol fortification.

Kan pai. (乾杯)

A toast. "Drink up," similar to "bottoms up." Chinese for this is *Gan-bei* (same writing).

Kanzukuri sake. (寒結くり酒)

Winter (cold) brewed sake, all modern sake is cold brewed.

Karakuchi. (辛口)

Dry sake, (SMV +1 to +5, s.g. 0.999 to 0.997).

Kinjo, see *Ginjo*.

Ki-Ippon. (生一本)

Undiluted sake from a single area, there is also an American brand (California Ki-Ippon) from American-Pacific Rim brewery in Los Angeles.

Kikizake choko. (きき酒 ちょこ)

The white porcelain "snake's eye" tasting cup, with two blue circles on the bottom.

Kôbo. (酵母)

Yeast, leaven, see also next.

Kôji. (麴)

We use *koji* in this book. Character is also pronounced *kiku*, which is the *Chinese* Japanese pronunciation. This is malt leaven; rice impregnated with *aspergillus oryzae* mold.

Komodaru see *hyôtaru*.

Kôso. (酵素)

Enzyme.

Makolee, Mak-joo (막걸리 맥주)

Korean homebrewed *jiu*. See Asian Homebrew.

Mao tai. (茅台)

China's most famous (and potent) alcohol drink, distilled liquor from Gueijau. Used for toasts at state banquets.

Masu. (杓)

A small wooden measuring box. They are often used to serve chilled sake. Originally they were used to measure quantities of rice, and later sake. The most popular size was one-gô, (about 6.1-oz, 180ml). The ones used in U.S. Japanese restaurants are usually smaller, and sometimes the boxes are lacquered.

Men, see *jiu men*.

Miyamizu. (宮水)

Literally "heavenly, or temple water." This was the special water found in the Nada area, and used to make sake. *Miyamizu* is soft water with phosphates, potassium, and medium amounts of sodium and calcium chloride, plus magnesium salts and, most important, it must have no iron, as that mineral will severely discolor *jiu*.

Moromi. (醪)

The main mash in sake production; raw sake taken from the *moromi* ferment.

Moto. (酵)

The starter ferment in sake production.

Nada. (灘)

The most famous Japanese sake production area in Hyogo prefecture east of Kobe.

Nakami. (中味)

Mild (semi-sweet), (SMV -1 to -3, s.g. 1.001 to 1.002).

Nakazoe. (中添え)

The second or middle addition of rice, water and *koji* in the *moromi* ferment.

Namazake. (生酒)

Unpasteurized sake.

Nihon-shu. (日本酒)

Another name for sake: Japanese *jiu*, lit. "rising-sun *jiu*," see also *seishu*.

Nikyu.

Second class sake (Japanese govt) (no longer used).

Nigori sake. (にごり酒)

Unfiltered, unrefined, cloudy sake.

Nomiya. (飲み屋)

Drink shop, bar, public house.

Noo Rook, nu-ruk. (누룩)

Korean enzyme which does the same job as *koji*. *Nu-ruk* is rice bran which has been impregnated with *aspergillus* type enzymes.

Odori. (踊り)

Literally "dancing" (ferment), the second day of *moromi*, when no rice addition is made, is used to give the newly fermenting mass time to work up to full strength. A lot of activity is visible, hence the name "dancing."

Sake (USA)

Ooamakuchi. (大甘口)

Quite sweet, (SMV -10 to -16, s.g. 1.007 to 1011).

Ookarakuchi. (大辛口)

Very dry, (SMV +6 to +12, s.g. 0.996 to 0.992).

Oshaku.

The tradition of filling your partner's sake cup to the brim.

Ping, Bing, Chiu Ping, see *jiu men.*

Racking.

Transferring fermenting wine, beer or *jiu* from one vessel to another, usually by siphoning.

Sakabune. (酒船)

Sake vat (fune/bune = "boat" or vessel).

Sakadaru, see *hyôdaru.*

Sakana. (肴)

Sake side dish (snack), lit. "fish." This can be as simple as a little salt on the edge of the sake box (masu).

Sakazuki. (杯)

Sake cup, glass, see also *choko.*

Sake kasu. (酒粕)

Sake dregs or pressings. These are used to make pickles, or in preserving fish. They are also used to make *amazake* (see).

San sei. (酸性)

Acidity.

Seishu. (清酒)

Refined (clear) sake, Japanese sake is also known as *Nihon-shu.*

Shan-niang Jiu. (善釀酒)

Medium sweet amber *jiu* style, from Shao Xing, with medium alcohol.

Shao Hsing Chiew.

Old spelling, still found on some labels, see next.

Shao Xing Jiu. (紹興酒)

Correct new Pinyin spelling except some labels). *Jiu* in the style of that from the Shaoxing district of China, Shao Xing may be an appellation.

Shibori. (搾り)

Pressing and filtering the finished sake.

Shôwa. (昭和)

Last Japanese chronological time era, under then Emperor Horohito, the years 1-65 are 1926-1989. If this (i.e., Shôwa 64 or 65 or earlier) is on the label, the bottle is old, 1988 or first week of 1989.

Shu. (酒)

The Japanese word for *jiu* (rice beer/wine), also pronounced sake.

Shubo. (酒母)

Yeast. Ferment.

Shuzô. (酒造)

Sake brewer.

Shuzôjô. (酒造場)

Brewery.

Shuzômai. (酒造米)

Special sake rice.

Sinica, see *Japonica*

Takjoo. (약주)

Korean: unfiltered joo (ju, *jiu*).

Tane koji. (種麴)

Seed *koji*: bran impregnated with *aspergillus oryzae* mold, used to produce *koji*. One pound of tane *koji* will make 100-lbs of rice *koji*.

Taruzake. (たる酒)

Cask (kegged) sake, usually in cypress barrels.

Tokkuri. (徳利)

A small porcelain serving bottle, usually 3- 6-oz (100-180ml) capacity.

Sake (USA)

Toji.

Sake brewmaster.

Tokkyu. (特級)

Special class sake, (Japanese govt). This sake is taxed the highest. Sake brewers pay good money to have their sake given this examination; and if they are successful, their reward is higher taxes. (No longer used.)

Tomezoe. (止め添え)

Third addition of rice, water and *koji*, in the moromi or main ferment of sake.

Topping-up.

This is filling the secondary fermenters to neck level (after racking) to limit oxygen entry into the fermenting vessels. After topping up, the vessels have fermentation locks attached (see).

Yakjoo. (탁주)

Korean medicine *jiu*. The Koryo Winery in Gardena CA brewed *yakjoo* between 1981 and 1983. Unpasteurized, cloudy and acidic.

Yamadanshiki.

Special rice grown in Hyogo prefecture. The “perfect” sake rice.

Yaya-amakuchi. (やや甘口)

Medium sweet. (SMV -3 to -5, s.g. 1.002 to 1.003).

Yaya-karakuchi. (やや辛口)

Medium dry. (SMV +1 to -1, s.g. 0.999 to 1.007).

Yodan.

Fourth addition of rice and/or water, and in Japan this is used to adjust the alcohol content by fortification.

酒

APPENDIX FIVE— MEASUREMENTS AND ANALYSIS OF YOUR JIU

Most winemakers and brewers use the percentage of soluble ingredients in beer and wine as a basis of measuring how much ferment is possible with a particular wine must or beer wort (batch). That is because these soluble ingredients are mostly fermentable sugar, and their measurement is a very good indication of how much alcohol will be produced. This measurement is usually done with a hydrometer (water measurer), although there are now a number of more accurate modern methods to determine this. The hydrometer measures specific gravity of a fluid. Specific gravity is the relationship between the weight of water and that of the substance in question.

Water has a specific gravity of 1 (1.000), and if you add sugar to water this increases the weight of water, so we can say that a sugar solution is heavier than water. A sugar-water solution with one percent of sugar will have a specific gravity (s.g.) of about 1.0039, a sugar-water solution with 12% sugar, will have an s.g. of about 1.0480, and that is the starting or original gravity of most average beer. A sugar-water solution of 26% will have a specific gravity of about 1.1000, and that is the starting point or original gravity of many table wines. A ferment will produce about half alcohol and half carbon dioxide gas, but of course not every soluble in a beer wort or wine must will ferment to alcohol. A 12% beer wort will produce about 4.8% alcohol (by volume), but a 26% wine must will produce about 12.5% alcohol, because more of the solubles in wine are fermentable. In the case of *jiu* and sake, there is no way to measure the amount of ferment-

able sugar in the mass until well after the ferment has begun. We can calculate what the original gravity was, but we can never actually take such a measure. A full strength genshu sake might have had an original gravity of about 1.120, but the highest actual gravity (at any one point) might have been only 1.045. This is all very confusing, and not at all accurate nor easy to measure. The ratio between percent of fermentable sugar and specific gravity is about 1:4. This is not a constant, but varies according to the sugar content, from 1:3.9 to 1:4.2. The higher the sugar content, the higher the ratio.

There is a special hydrometer used to find this percentage, it is called a saccharometer (sugar meter). This percentage is called a degree of Balling, Plato, or Brix (B,P,B). Dr. Balling, a Bohemian, established his system of measurements to follow the progress of fermenting beer (and wine). Dr. Plato, a German, revised those figures, hence the degree Plato. Plato's measurements were more accurate, so the American and German brewing industries use his figures. The American wine industry uses that scale too, but they still call their measurements degrees Balling. The wine industry uses the very same scale to determine the sugar measure of the wine must before yeast is added for the ferment. They call those degrees "Brix." A degree Brix is the same as the degree Balling, which is (now) the same as the degree Plato, and they all are equivalent to about one percent (by weight). One percent, or degree Balling, Plato, or Brix is roughly equivalent to about 4 specific gravity points. The Baumé scale comes from France, and it is used in sugar measurements. The U.S. sugar industry uses the Baumé values for sugar based syrups. One degree Baumé is a specific gravity increment of about 6.9. i.e. 1 Bé = sg 1.006.9, 1 Bé = 1.8 Plato, Balling, or Brix.

The sake meter value (SMV) is a Japanese measurement, based on the Baumé saccharometer. One degree Baumé (Bé) is 10 SMV degrees. Therefore, one

SMV = 1.000.69 (1.00069) specific gravity or 0.18 Plato. But wait, there's more. Dry sakes and wines have negative specific gravity and Baumé values, sweet sakes have positive s.g. and Bé values because of the presence of sugars in the beverage.

There is one further complication. The presence of alcohol in a beverage alters the specific gravity, because alcohol itself has a specific gravity (s.g.) of only 0.796. I call this a negative s.g., because as it is lighter than water and has a value (0.796) less than that of water (1.000). If you measure the specific gravity of dry sake, and find it to be 0.996, this would be about -1 degree Plato, or -0.58 degree Baumé, negative because it is lower than that of water (0 Bé or P). This would translate into a sake meter value (SMV) of 5.8. However the SMV would be POSITIVE, i.e. +5.8! That's because in the world of sake, *negative values are positive SMV units*. Conversely, a reading of sg 1.004 would be 1 P, or 0.58 Bé, but SMV -5.8. So when we talk SMV, think positive when its negative. Clear?

ACID

The conversion is simple: acid is determined by measuring the addition of 1/10 Normal Sodium Hydroxide (0.1 normal NaOH) to a measured sake sample, until the color change described in the directions takes place. If you follow the instructions in the kit, you'll determine the percent of acid (as tartaric). To find the parts per thousand (ppt) acid (as succinic—the Japanese standard) you would multiply that figure by 7.067. If you know the ppt succinic, multiply that by 0.1415 to find pct tartaric. Clear as a bell? Loosen up, cease from fretting, and sip some sake.

COLOR

Color is another factor in the sake profile. In the absence of industry figures I have devised my own system of measurement. The standard is based on 2 liters of water with one drop of yellow food dye added. I call this yellow color 1 (100%). Place a glass of this beside your tasting glass and compare color. Most commercial sakes will range from 0.15 to 0.5 (15-50%) in color depth by this comparison. This is the final item in the sake profile. *Moromi* and *nigori* sakes will be milky white tinged with yellow. The Chinese *huang jiu* (amber *jiu*) will be much darker and should be simply noted in that fashion. i.e. light, medium, or dark amber, or whatever you judge it to be.

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APPENDIX SIX— TABLE OF WEIGHTS AND MEASURES:

(Japanese-Chinese-US-British-Metric)

The Chinese and Japanese each used uniform measures, which were established long before those in Europe. In Japan, the earliest of these may have been boxes of graduated size called *masu*. They were standard, and one could nest them when not in use, creating an attractive display. The basic *masu* was a measure called the *shô*, about 1.8 liter in volume. The Japanese measuring system is very pertinent to sake production, because it is entirely volumetric. The country went metric in 1957, but the old weights and measures are still popular.

1 <i>shaku</i>	= 0.61 US fl oz	= 18ml	=0.63 UK fl oz
10 <i>shaku</i> = 1 <i>gô</i>	= 6.09 US fl oz	= 180ml	=6.33 UK fl oz
10 <i>gô</i> = 1 <i>shô</i>	= 60.86 US fl oz	= 1.8 liter	=63.36 UK fl oz
(the standard sake bottle is the <i>shô</i>)			
10 <i>shô</i> = 1 <i>to</i>	= 4.75 USgal	= 18 liter	=3.96 UKgal
4 <i>to</i> = 1 <i>Hyô</i>	= 19 USgal+2.6oz	= 72 liter	=15 UKgal
			+117fl oz

(the standard sake keg is 1 *Hyô*—0.61 US (beer) barrel)

10 <i>to</i> = 1 <i>koku</i>	= 47.55 USgal	= 180 liter	=39.59 UKgal
(a <i>koku</i> is a standard rice measure = 4.96 bushel)			

CHINESE MEASURES

China also uses the metric system, but the units are named after the old measures⁽⁷⁾. China has used the metric system since before the war.

1 <i>sheng</i>	= 33.81 US fl oz	= 1 liter	=35.2 UK fl oz
10 <i>sheng</i> = 1 <i>tou</i>	= 2.64 USgal	= 10 liter	=2.2 UKgal
10 <i>tou</i> = 1 <i>shih</i>	= 26.42 USgal	= 100 liter	=22 UKgal

Professor Li's descriptions and formulas⁽⁷⁾ include

the weight measure "*catty*." 1 *catty* = 16 *taels* (Chinese ounces) = 500 grams = 17.6 ounces.

It is interesting to note that the Chinese characters used are the same between certain Japanese and Chinese units even though the volumes differ: (*tou* & *to/sheng* & *shô/shih* & *koku*).

Tou (Ch), *To* (J). (斗)

Sheng (Ch), *Shô* (J). (升)

Shih (Ch), *Koku* (J). (石)

酒

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(numbers in parenthesis in the text of this book indicate references listed below)

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Fred Eckhardt
Portland OR
June 1992

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